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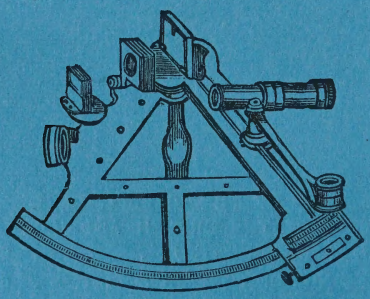

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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Zambezia, the new British Possession in Central South Africa.

By E. A. Maund.*

Map, p. 712.

A vigorous spirit of commercial enterprise is now busily opening up that rich territory of Zambezia so long traversed by our explorers and ivory hunters, and which only so lately was declared "within the sphere of British influence." The British South Africa Company, empowered by royal charter, will in the immediate future find occupation, homes, and probably riches for thousands of our overteeming population, who are ever eager to colonise, when, as in the present instance, so promising a land is brought within their reach.

Five years ago Sir Charles Warren's expedition opened up the grazing farms of Bechuanaland as a new field for emigration. This has since grown into a thriving crown colony with two fast growing towns, Vryburg and Mafeking, and a railway in construction to traverse it. Matabeleland was then a *terra incognita*, difficult and dangerous to approach. Ignorance created these illusions, which a more intimate acquaintance has now happily dispelled. The telegraph is fast connecting us with nearly a thousand of our countrymen, gone in to prospect and settle in this once far-off Matabeleland. They are now about Mount Wedsa, at the head of the Sabi river, a locality for years much coveted by trek Boers, as the rich valleys there afford splendid farming opportunities.† There is now an organised post and coach communica-

* Read at the Geographical Section of the British Association for the Advancement of Science, Leeds Meeting, on Sept. 5th last.

† Since the reading of this paper, the above-mentioned expeditionary force has arrived at Mount Hampden, lat. 17° 35′, long. 31° 22′, without let or hindrance from the Matabele. The occupation of Mashonaland is therefore an accomplished fact. Mount Hampden is, we are informed, to be the headquarters of the Company for administrative purposes. The natives have heartily welcomed the white man; and reports from the experts show that the auriferous nature of the country has not been overrated; indeed, the richness of the country traversed by this pioneering expedition, both in gold and farm lands, caused many of its members to wish to settle long before reaching the objective point, Mount Hampden, and many prospecting parties from the Transvaal and Cape Colony, are now fast trekking for this New Eldorado.—E. A. M.

2020.26.1.1

tion with Kimberley; and Gu-Bulawayo, the king's chief kraal, is actually within thirty days of London.

I wish to draw the attention to this territory of Zambezia, so quickly being developed, of those who have few opportunities of reading the Royal Geographical Society's reports, and who rarely see our instructive, but too quickly pigeon-holed blue-books.

Of course, many of those forming the Mashona Land pioneering party are fresh to African travelling experiences, and consequently may form and give adverse opinions on the country. It is, however, a splendidly equipped expedition, responsible positions being held by good men, capable of sound judgment—men, too, who have been, seen, and think it good enough to go again. For years past, unfortunately, there have been those who, when they got down country, from what used to be the "interior," loved to pose as heroes by accounts of the dangers and difficulties they had gone through, and it was this foolish way of mountainising molehills which retarded many from going to see for themselves.

Matabele Land, which lies between 16° and 22° S. lat. and 27° and 33° E. long., is the most promising country for colonisation in South Africa, lying high, generally healthy, rich in minerals and soil, and sparsely populated. The people are not half so black as they are painted (I mean in character). Notwithstanding all the malicious reports to the contrary, the king and people have kept to their promises of friendship to the English, given, when their headmen came to England last year, to see if we were more respectable than the Boers made us out to be.

Lobengula has allowed the construction of a road on to Mount Hampden, at the sources of the Mazoe river, which, passing the Lundi river at 20½° S. lat., goes on viâ Mount Wedsa to open up Mashona Land; he even sent his Indunas to greet the expedition now passing through his territory. Of course savages are proverbially fickle, but the chartered company are now in a position, should it ever be necessary, to protect their working parties from the much overrated Matabele hordes.

The country dominated by the Matabele (I cannot say governed) is as big as Germany, and very thinly populated; while the actual territory occupied by them is very small, and would compare about as Bavaria does to the German Empire. They rule from this centre much as the Roman military colonies did in barbarian Europe, without, however, the same civilising influence. Their kraals occupy the plateau forming the watershed between the Zambezi and the Crocodile rivers, which varies between four and five thousand feet above sea-level.

It is unnecessary to dwell here upon the Matabele nation, whose history has been one of bloodshed since their exodus from Zululand, and who still live under a military despotism of the worst kind. The terror

of their assegais reaches beyond the Zambezi, while witchcraft claims many a victim among their own kraals. No better illustration can be given of these horrors than the sinister name of Lobengula's head kraal, *Gu-Bulawayo*, which means, "The place of killing."

We have now gone among them not as judges, but to change all this killing and slavery by civilising influences; for we should not ourselves forget that, though it may be three-hundred years since we burned bishops and tortured for religion, yet it is actually as late as the eighteenth century that we burned a witch in Perthshire.

It is with reference to the country where the Matabele chief kraals are situated that I would now speak, as during visits in 1885 and 1888, as well as during several months' stay with the king this and last year, I have had the chance of mapping and prospecting this district. It will also give some idea of what England is now busily opening up. Witchcraft so terrorises the people that many were the amusing stratagems I had to have recourse to in obtaining angles from the hill-tops. Their confidence in me, after bringing their Indunas safe home again from their wondrous voyage, was often rudely shaken. "Maundi must be a bit of a *tagati* (witch) when his sextant brought down the sun," and they were very doubtful whether shooting a kraal with a prismatic compass might not keep the rain off the cornfields in its vicinity. The rains, however, were particularly heavy this year; in the neighbourhood of Bulawayo no less than 40 inches of rain were measured during the months of November, December, January, and February. Like all tropical rains they are not continuous, but come on in terrifically heavy thunderstorms, with hot sunshine between. For several weeks before the rains actually fall the clouds bank up and threaten. Then is the king busy with his witch-doctors, making fell potions to charm the clouds to break. One sees him anxiously gazing at every heavy cloud, for the people come in from all parts to beg rain from him, "their rain-maker," for their parched grounds. And many is the laugh I have had with him on the subject when, after a heavy rain, the people come to "*bonga*" (praise) him. Great then is his good humour, but he is far too shrewd to be a believer in his own powers in the rain-making line.

The months of September and October, before the rains, are the hottest in the year. All vegetation appears to be burnt up, and the country has a dreary aspect. Cattle grow thin, and the vast herds are sent off low down the rivers to find grass and water. In September I have registered a maximum in the shade ranging between 105° and 111° F.; but the atmosphere is so dry that one does not feel it; 85° near the sea coast, with the air saturated with moisture, being comparatively much hotter. The evenings and mornings are delightful, and at an elevation of 4000 feet the heat is not enervating, in fact we used to play lawn tennis through it, much to the amusement of the natives. During the winter months, May, June, and July, it is often very cold at night

in these highlands. Even on the Macloutsie river, at elevations under 3000 feet, I have known 15° of frost at night, with the thermometer ranging over 80° in the day, as measured by instruments registered at Kew. Mealies put in soak for the horses over-night have been frozen nearly solid in the morning. Notwithstanding this great variation in temperature, this season is particularly healthy. Trek oxen suffer from the dryness of the grass and cold; so do the poor unclothed natives, who do not thaw out until the sun has well aired the day. The climate is, however, well adapted to the Anglo-Saxon, who can work all the year round in it. There are Englishmen who have lived up there for the last 15 or 20 years. And what is more essential for good colonisation, white children thrive well, some of the missionaries and traders having reared large families. Of course, low down the river banks, during the rainy season, one expects to find fever, as in every new country, but houses built a few hundred feet above the river avoid any such danger.

The Matabele corn-land principally lies in the district embraced by the map accompanying this paper, and when the clouds begin to bank they begin to pick, for as yet the king sets his face against ploughs. Sowing goes on in October and November, and after the first rains it is marvellous the rapidity with which the grass and corn grow. The russet brown country changes suddenly to an emerald green, and the grassland, which is good and abundant, and forests are ablaze with flowers of every hue. Those so soon to have farms up there will assuredly choose this season when wishing to effect a land sale. Harvesting goes on in May and June, and much of the corn is soon turned into Kaffir beer, the national drink, while a good deal is traded for coloured cotton and beads. Kaffir corn was traded last year for five-shillings' worth of goods per sack, but mealies were more difficult to buy. There is a great future in the corn as also in the cattle trade for this country. As I have mentioned, during the winter, or dry season, the cattle are sent off the plateau down the rivers, as higher up the water only remains in pools, the rains being so heavy that they run off quickly into deep channels; but by judicious storage of this rain supply vast tracts might be irrigated, while springs are numerous and only want opening up. In the Gu-Bulawayo district the soil is very deep and rich. Anything and everything seems to grow and flourish. At Shiloh, where Mr. Thomas, a missionary, now dead, led on water from a spring, and made a large garden, I reaped and thrashed out several sacks of excellent English wheat. I planted potatoes too, which gave a very good crop. Cabbages, carrots, onions, marrows, beans, peas, cucumber, tomatoes, and lettuce also throve well. In fact, all European vegetables, as well as sweet potatoes and mealies, grew very quickly in this irrigated ground. The rivers are generally in beds too deep to run the water off except at great expense; but windmill pumps, nuriyas, and dams could be utilised. With the aid of water, almost any fruit seems to flourish.

From the same garden, we enjoyed large crops of oranges, lemons, figs, grapes, bananas (or rather plantains), peaches, apricots, pomegranates, mulberries, and Cape gooseberries. The date-palms and apple-trees, though growing well, were too young to bear. The orange and lemon trees grow luxuriantly and fruit well. So too do the figs. There were beautiful groves of them in this missionary's garden. The vines grown over high trellised alleys also bore a great deal of luscious fruit. The white ant is the gardeners' enemy, but luckily he seems to prefer the sandy soil to the rich loams. Many will be the splendid market gardens by and by to supply the mining centres. The Matabele women are the labourers. One sees during the picking season long rows of girls, often with a queen among them, keeping time with their mattocks to a not unmelodious chant. Great quantities of excellent tobacco are grown by the Mashonas and Makalakas, that grown at Inyoka, of which the king receives a yearly tribute, being considered the best. It is principally converted into snuff. The rice grown in Mashona Land is excellent, and cost last year about eighteen shillings' worth of goods per sack. The grass, corn, rice, tobacco, and gardening capabilities of this country are sufficient allurements for farming colonists, while undoubtedly it would produce coffee and sugar. Cotton and indiarubber we know it produces in the north, as the Mashonas weave blankets of the former, and make candles of the latter. Indigo grows as a weed, and is used by the Mashonas for dyeing their home-made blankets.

Farmers have to combat lung sickness among cattle and that terrible scourge horse-sickness. Inoculation and quarantine laws will stamp out the former. The natives now inoculate for lung-sickness, a treatment which is very successful, but they do not understand closing infected districts. For horse-sickness a specific has still to be found. It comes on yearly after the rains. In good years one per cent. perhaps will die, whereas in a bad season like the last one, a high percentage succumb. I lost eleven horses out of thirteen in a week. A "salted horse," or one which has gone through the sickness, and therefore is supposed to be proof against it, will cost you 50*l.* or 60*l.*, whereas a very serviceable horse can be bought for 10*l.* down country.

Matabele Land is well wooded, though the timber is not large. The *mopani*, a hard-wood capable of withstanding white ants, is useful for building and firewood, while its bark tans excellent leather. Until coal is found nearer than the Zambezi valley there is a good and sufficient supply for mining purposes.

It is to the mineral riches, however, that we must look for the quick development of this country. The gold in Mashona Land will, I believe, create a "rush" only to be paralleled in the development of California and the Western States of America. In the accompanying map no less than twenty reefs will be seen marked, which, as far as the suspicious natives would allow, I prospected. In some of these we found free gold,

and colour in the watercourses below them. Old workings, too, were visible, which shows that at one time this quartz was worth working, even with crude appliances. There is a banket formation similar to that in the Transvaal in this district. While north of the Ramaquoban river the Charter Prospectors found a large body of reef which returned as much as 2 oz. of gold to the ton. These riches running among and even through the Matabele kraals must for the present lie undeveloped. The rich gold reefs in Mashona Land have been written and talked about for the last twenty years, and below Mount Hampden alluvial deposits are known to exist. This poor man's gold-field the Company has now sent experts to develop. It is from this Mazoe and Hanyani district that the natives bring gold-dust in quills for sale to the white men, notwithstanding the known penalty of death they risk in the traffic. But all this we will hope is now changed. The natives know that the white man will have the gold where it is known to exist, and they have wisely made the best of the situation by putting themselves in the hands of a strong company countenanced by the Great White Queen, who will befriend and not dispossess them.

From numbers of natives who yearly go from here to find work in Johannesburg and Kimberley, the people generally have learned that it is better to have the benefits arising from these mines nearer their own homes. Hence the mass of the working population are in favour of the white man crushing their quartz, and thus saving them 800 miles' tramp southwards.

The Makalakas and Mashonas, the original inhabitants of the country, though physically much inferior to their masters, the Matabele, are clever and willing workers. They fashion the hematite iron, in which mineral the country is particularly rich, into a variety of objects, principally, however, at present into assegais. The copper, too, in the country was formerly smelted by them, as is evidenced by old copper workings I have seen.

When once the Matabele learn the benefits and freedom to accrue from the white man's rule they will soon, I believe, work as well as the Zulus in Natal. If, however, they will not change the assegais for the pick and the plough, then gradually they will disappear beyond the Zambezi before the inevitable march of civilisation; and from among the downtrodden Mashonas and Makalakas we shall find plenty of labour for both mines and fields.

It is strange that this country, so long reputed to be rich in gold and other minerals, of which Baines wrote twenty years ago as being the Land of Ophir, should until now have baffled our colonising instincts. The work, however, has now begun under the most favourable auspices. The administration of Zambezia is already organised, law and order will reign wherever the Chartered Company penetrate. The revolver, bowie knife, and spirit saloon will there have no place. Gold laws are

framed, and the ivory-giver, the elephant, will now be preserved instead of exterminated. Raiding and slavery must cease; and Christianity will spread where hitherto the missionary's labours have been well nigh fruitless.

We English colonise native territories to make them pay. We know that "a strong executive means order," and that stirring up native strife only necessitates costly expeditions. Slavery it is our ambition to abolish. So, too, we suppress the liquor traffic as breeding infinite troubles. Bechuana Land is a happy example of what can be done in this line. Khama's people are rapidly becoming civilised, and afford a good market for our goods. The greed for gold will always overcome climatic difficulties.

The Partition of Africa.

Map, p. 712.

Now that the greater part of Africa has been parcelled out among the European Powers, it may be useful to indicate what are the limits of the claims of each of these powers, and on what these claims are based. It has been sought to show in the accompanying map the boundaries of the claims of the various Powers, so far as these have been settled by international agreement. Where the space has been left blank it is because there is no express agreement, or the limits have been left vague intentionally by the Powers concerned, or the particular districts are so far independent. An unbordered wash of colour is intended to signify that the area indicated is left to the undisputed operations of one Power. In the text we have embodied some valuable notes compiled by Mr. John Bolton, F.R G.S.

Except Morocco, Liberia, certain Central Sudan States, the Sahara to the south of Tripoli, and a small area south of Darfur and Wadai, there is hardly any part of Africa that is not directly or indirectly "within the sphere" of some European Power.* Algeria and Tunis are admittedly French by right of conquest. Tripoli, with Fezzan, are acknowledged as being part of the Turkish Empire. Egypt proper acknowledges Turkish suzerainty in so far as to pay an annual tribute. In all other respects Egypt is practically independent of Turkey; as a matter of fact she is at present under British control. What is still known as the Egyptian Sudan will be dealt with later on.

Starting from the west coast of Morocco and proceeding southwards, we find that to the north of Cape Nun, on the coast of Morocco itself, at the mouth of the Ifni river, a small concession of 15 square miles has been made by the Sultan to Spain, though up to the present date the

* These States in the map have a blackish tint.

Spanish Government has not taken actual possession. On some maps the coast-line between Cape Nun and Cape Blanco is laid down as Spanish, though the Spanish Government (since 1886) only claims as a protectorate the strip between Cape Bojador and Cape Blanco, measuring about 500 miles (26° 8′ N. to 20° 51′ N.). The coast boundary between the French and Spanish claims is fixed by arrangement between the two countries, but the interior limit of the Spanish possessions has not yet been settled between France and Spain. According to Spanish authorities treaties have been made with the Sultans of Adrar and neighbouring territories, placing them under Spanish protection; so that the southern limit extends inland 600 miles towards Timbuktu, and the northern limit 420 miles from the coast towards Tenduf. The Spanish Government has formally notified this protectorate to the British Foreign Office. There is a British factory at Cape Juby, but the British Government makes no claim to any protectorate there.

The French Senegambian possessions begin at Cape Blanco. The whole coast-line down to British Gambia is French. France, by right of conquest and by treaties with native chiefs, claims the whole of the basin of the Senegal, all the basin of the Gambia except the British strip, and nearly the whole of the Upper Niger basin as far as Sego. The map of M. Binger's travels just published, extends the French sphere further south and further east than international agreement justifies. With regard to the coast delimitation, we find that the first check coming southwards is met with at the river Gambia. The boundary here is framed by Article I. of the arrangement concerning the delimitation of the English and French possessions on the West Coast of Africa, signed at Paris, August 10th, 1889.

"In Senegambia the frontier line between the English and French possessions shall be established as follows:—1. To the north of the Gambia (right bank) the line shall start from Jirmak creek and follow the parallel, which traversing the coast at this point (about 13° 36′ N.), intersects the Gambia at the great bend it makes towards the north, opposite a small island situated at the entrance of Sarmi creek, in the country of Niamena. From this point the frontier line shall follow the right bank as far as Yarbatenda, at a distance of 10 kilometres from the river. 2. To the south (left bank) the line starting from the mouth of the San Pedro shall follow the left bank as far as 13° 10′ of north latitude. The frontier shall thence follow the parallel which, starting from this point, goes as far as Sanding (end of the Vintang creek, English map). The line shall then trend upwards in the direction of the Gambia, following the meridian which passes through Sanding, to a distance of 10 kilometres from the river. The frontier shall then follow the left bank of the river at the same distance of 10 kilometres as far as, and including Yarbatenda."

French territory extends from the southern boundary of the Gambia colony to Cape Roxo, south of the Casamansa river, where a wedge of Portuguese territory intervenes. This is known as Portuguese Guinea, and extends from Cape Roxo on the north to the mouth of the river Cajet on the south, between Catack Island (which is Portuguese) and

Tristão Island (which is French). According to a convention of May 12th, 1884, ratified August 31st, 1887, between France and Portugal, the northern boundary between the territories of the two countries, starting from Cape Roxo, proceeds eastwards at an equal distance from the rivers Casamansa and San Domingo de Cacheu, to the intersection of the meridian of 15° 10′ W. of Greenwich with the parallel of 12° 40′ N. lat. Between this point and 13° 40′ W. of Greenwich the frontier coincides with 12° 40′ N. On the east the frontier follows 13° 40′ W., from 12° 40′ N. to 11° 40′ N. On the south the boundary starting from the mouth of the Cajet river proceeds in a northerly direction at an equal distance north of the Componi river and the Cassini river, then of the northern branch of the Componi and the southern branch of the Cassini, at first, and afterwards of the Rio Grande, ending at the point of intersection of 13° 40′ W. and 11° 40′ N.

Then follows about 200 miles of French coast until the boundary of the British colony of Sierra Leone is reached. A little more than half-way south we find the small group of the Los islands, at Conakri, which are claimed as British.

At Sierra Leone, Great Britain has a stretch of coast-line extending 200 miles from the Mahela Creek north of the Scarcies river to the Manoh river near Cape Mount. The colony reaches inland about 200 miles in its northern section, tapering off in the south to a narrow strip. The eastern limit has not yet been defined. An expedition will shortly leave England in order to take part in the delimitation towards the interior. Article II. of the Anglo-French Arrangement states:—

"To the north of Sierra Leone, in accordance with the provisions of the treaty of 1882, the line of demarcation, after having divided the basin of the Mellacoree from that of the Great Scarcies, shall pass between Bennah and Tambakka, leaving Talla to England and Tamisso to France, and shall approach the 10th degree of north latitude, including in the French zone the country of the Houbbous, and in the English zone Soulimaniah and Falabah. The line shall stop at the intersection of the 13th degree of longitude west of Paris (10° 40′ of Greenwich), as marked on the French map, and of the 10th degree of latitude.

The Manoh river forms the boundary between Sierra Leone on the north and the Republic of Liberia on the south. The coast-line of Liberia extends for about 450 miles to the San Pedro river, with an average breadth of 150 miles in the interior. No precise delimitation of Liberia towards the interior has been arranged.

Between the eastern boundary of Liberia and the western boundary of the French territories on the Gold Coast, is a strip of territory which up to the present is no man's land, probably, with the exception of that at Cape Juby, the only unclaimed bit of all the African coast; it is about 100 miles in length. The French strip of coast here, extending from Grand Lahou to Newtown, and including Grand Bassam and Assinie, measures about 100 miles. The Anglo-French Agreement (Article III.)

defines the boundary between the French and British claims on this part of the coast as follows :—

"On the Gold Coast the English frontier shall start from the sea coast at Newtown, at 1000 metres to the west of the house occupied in 1884 by the English Commissioners. It shall thence go straight to the Tendo Lagoon. The line shall then follow the left bank of that lagoon and of that of Ahy and the left bank of the river Tanoe, or Tendo, as far as Nougoua. Starting from Nougoua the frontier line shall be fixed in accordance with the various treaties which have respectively been concluded by the two Governments with the natives. This line shall be prolonged to the 9th degree of north latitude.

The Gold Coast extends eastwards for 350 miles to Bé, east of the Volta river, where it adjoins the German acquisition of 1884.

The eastern boundary is defined by Article IV of the Anglo-German Agreement signed at Berlin, July 1st, 1890 :—

"In West Africa—1. The boundary between the German Protectorate of Togo and the British Gold Coast Colony commences on the coast at the marks set up after the negotiations between the commissioners of the two countries of the 14th and 28th July, 1886 ; and proceeds direct northwards to the 6° 10′ parallel of north latitude ; thence it runs along that parallel westwards till it reaches the left bank of the river Aka ; ascends the mid-channel of that river to the 6° 20′ parallel of north latitude ; runs along that parallel westwards to the right bank of the river Dchawe or Showe ; follows that bank of the river till it reaches the parallel corresponding with the point of confluence of the river Deine with the Volta ; it runs along that parallel westward till it reaches the Volta, from that point it ascends the left bank of the Volta till it arrives at the neutral zone established by the agreement of 1888, which commences at the confluence of the river Dakka with the Volta."

The precise boundaries in the interior (both on the French and German sides) cannot be regarded as definitely settled. Our knowledge of the interior is scanty, and the situation of towns and the course of rivers as laid down on our maps erroneous. German Togo-land extends to 1° 41′ E., where it marches with another wedge of French territory. The points occupied by France (1884) are Grand Popo, Agoué, or Ajigo, Porto Novo, and Kotonou. Although on December 22nd, 1887, Portugal withdrew her protectorate over the sea-coast of Dahomey, she actually still occupies the port of San Juan de Ajuda (Whydah) with a military force.

Next in order come the Colony of Lagos, the Royal Niger Company's Territories, and the Oil Rivers, with a coast-line of 500 miles, the British sphere extending inland a distance of over 600 miles, bounded on the west as far north as the ninth degree of north latitude by the French Slave Coast territory defined thus in Article IV. of the Anglo-French Arrangement :—

" On the Slave Coast the line of demarcation between the spheres of influence of the two Powers shall be identical with the meridian which intersects the territory of Porto Novo at the Ajarra creek, leaving Pokrah, or Pokéa to the English colony of Lagos. It shall follow the above-mentioned meridian as far as the 9th degree of north latitude where it shall stop. To the south it shall terminate on the sea-shore

after having passed through the territory of Appah, the capital of which shall continue to belong to England."

The eastern limit is bounded by the German sphere in the Cameroons and is provisionally defined in Article IV., paragraph 2, Anglo-German Agreement:—

"It having been proved to the satisfaction of the two Powers that no river exists on the Gulf of Guinea corresponding with that marked on maps as the Rio del Rey, to which reference was made in the Agreement of 1885, a provisional line of demarcation is adopted between the German sphere in the Cameroons and the adjoining British sphere, which starting from the head of the Rio del Rey creek goes direct to the point about 9° 8′ of east longitude, marked 'Rapids' in the British Admiralty chart."

The boundary to the north is fixed by paragraph 2 of "Declarations exchanged between the Government of Her Britannic Majesty and the Government of the French Republic," signed at London, August 5th, 1890, thus:—

"The Government of Her Britannic Majesty recognises the sphere of influence of France to the south of her Mediterranean Possessions up to a line from Say on the Niger to Baruwwa on Lake Tchad, drawn in such manner as to comprise in the sphere of action of the Niger Company all that fairly belongs to the kingdom of Sokoto; the line to be determined by the Commissioners to be appointed."

The eastern and western limits other than those above defined are left for future settlement—the latter by English and French Boundary Commissioners, the former by treaties to be made with the native rulers under the English or German Powers, the following clause having been inserted in Article V. of the Anglo-German Agreement:—"All treaties made in territories intervening between the Binué and Lake Chad shall be notified by one Power to the other."

This, then, disposes of the whole coast down to the mouth of the Rio del Rey and of the corresponding Hinterland, although details of delimitation remain to be settled. The French traveller, Captain Binger, is stated to have concluded treaties with several powerful chiefs in the Mandingo region, including Kong. These will, of course, be the subject of further international deliberation. Timbuktu and the Niger down to Say is virtually recognised by Britain as within the French sphere; as is the whole of the Sahara north of the irregular line from Lake Chad to the mouth of the Senegal. Morocco is not likely to claim Hinterland; the limits of Spanish claims in the interior will no doubt be amicably adjusted; while of course Turkey, on behalf of Tripoli, may reasonably object to France encroaching on the region to the south of that country. Ashanti is quite clearly within the British sphere, though there is a disposition on the part of the Government to allow Germany to claim at least a portion of it; the interior limits are being arranged by an international commission. Sokoto and its tributary states are acknowledged to be British, while British enterprise is free to include in its sphere Bornu, Bagirmi, Wadai, and neighbouring regions not expressly allotted

to either France or Germany. From both sides they come naturally within the British sphere. As to Darfur and Kordofan, the latter is entirely, and the former to a large extent (see map), within the British sphere according to the Anglo-German agreement of July 1890; this gives the western waterparting of the basin of the Nile as the western boundary. The rest of the Egyptian Sudan may be regarded as at present in revolt.

South of the German Cameroons comes the enormous territory acquired by France, including the Gabun and the French Congo Territory. There is, however, a block on the rivers Muni and Campo, 40,000 square miles, claimed by Spain, but the claim is not admitted by France.

By agreement between France and Germany, dated December 24th, 1885, the latter agrees not to interfere in any way south of a line running eastwards from the mouth of the river Campo to a point 15° east from Greenwich. On the south side of her Congo territory, France marches on the coast with the small enclave of Cabinda, which Portugal was allowed to retain at the Berlin Conference. By a treaty between France and Portugal, dated May 12th, 1886, ratified August 31st, 1887, the frontier between the possessions of the two countries in the Congo region follows a line from Chamba Point, at the confluence of the Loema and the Lubinda, keeping at an equal distance from the two rivers, and from the most northerly source of the Luali follows the line which separates the basins of the Loema and the Chiloango to 12° 50′ E. of Greenwich; the boundary then coincides with this meridian till it meets the Chiloango, which is here the frontier between the Portuguese possessions and the Congo Free State. This latter frontier is continued down the Chiloango to its confluence with the Lucalla, up the latter river to its junction with the Culacalla, thence directly south to the parallel of Cabo Lomba, thence westward to the coast at Cabo Lomba.

This arrangement was simple enough, but it was a much more difficult task to adjust the boundary between the territories of the Congo Free State and the French Congo territory. There was no difficulty on the Lower Congo. According to the "Declaration of the Administrator-General of the Department of Foreign Affairs of the Independent State of Congo, February 1885" (accepted by the Berlin Conference), the boundary follows the Chiloango to its source, the water-parting between the Niadi-Kwilu and the Congo till it reached the meridian of Manyanga; then follows a line (subsequently, 22nd November, 1885, determined by commissioners) down to beyond Manyanga on the north bank of the Congo. It was different when France came to fix the eastern limit of her claim. The limit given in the Convention of February 5th, 1885, was found to be inconsistent with the geographical position; and the discovery of the course of the

Mobanji by Mr. Grenfell, in March 1885, led to further complications. Suffice it to say that by an agreement made at Brussels, April 29th, 1887, it was decided that the Mobanji as far as its intersection with 4° N. lat. should form the frontier between the French possessions and the Congo Free State. In the spirit, if not in the letter, of the declaration above referred to, the Mobanji-Welle forms the northern boundary of the Free State till it reaches the 4th parallel, which then becomes the boundary as far as 30° E., the river being included when it bends north of 4°. It is understood that an agreement exists between France and the Congo Free State, by which the former claims the whole of the Congo basin north of the line just referred to, and east of 15° E. long. The further boundaries of the Free State will be seen on the map; they are so precisely stated in the Declaration referred to that they cannot be mistaken, at least in the east. They leave outside the boundary the south-west corner of Lake Tanganyika, the east coast of Lake Moero, and all but the south-west corner of Lake Bangweolo. From 12° to 6° S. the boundary is the "partage des eaux qui appartiennent au bassin du Kassai." It then goes west along the 6th parallel to the Kwango, down the Kwango to the parallel of Nokki, thence to the mouth of the river Ango-Ango, and down the Congo to the sea. Portugal claims Lunda by virtue of treaties alleged to have been made by Captain Carvalho some years ago, but these claims are strongly opposed by the Free State, which maintains that Lunda is in its sphere; as a matter of fact it mostly belongs to the basin of the Kassai above referred to. At present the difference remains unsettled.

With this exception, about the limits of Portuguese West Africa there is now no difficulty. Its northern boundary, where it marches with the Congo Free State, is settled by the Berlin Act, and so indeed was thought to be its eastern boundary along the Kwango, so far as Lunda is concerned, until a few weeks ago. Its southern limit is equally definite. According to the agreement between Germany and Portugal, December 30th, 1886, the river Cunene forms the boundary between Portugal and Germany in West Africa as far as the cataracts south of Humbe. Hence the dividing line goes direct eastward to the Cubango; along that river to Andara and eastwards to the Katima rapids on the Zambezi. Both France and Germany in their arrangements with Portugal recognised in general terms the liberty of the latter to extend her influence in the region between her East and West African possessions. But, as will be seen, the claim was not admitted by Great Britain, and the special arrangement with Germany was afterwards modified.

Into the history of the acquisition by Germany of Damaraland and Namaqualand, it is not necessary to enter. It was here, at Angra Pequena Bay, that Germany made her first annexation beyond Europe, April 24th, 1884. By Memoranda, exchanged in September and October

1884, between the two Governments, the German Protectorate was recognised over the region between the Orange river and Cape Frio, Walvisch Bay being reserved for the Cape. This British territory is undefined; it extends about 40 miles north and south by 20 east and west, and is thus referred to in the concluding paragraph of Article III. of the Anglo-German Agreement:—

"The delimitation of the southern boundary of the British territory of Walvisch Bay is reserved for arbitration, unless it shall be settled by the consent of the two Powers within two years from the date of the conclusion of this Agreement. . . . Until a settlement shall be effected, the territory shall be considered neutral."

As the earlier arrangements as to the interior limits of the German sphere have been annulled by those quite recently made with Germany and Portugal, it is unnecessary to quote them. We now come to British South Africa, the provisional limits of which are regulated by the Anglo-German Agreement of July 1st, 1890, and the Anglo-Portuguese Agreement of August 20th, 1890 (not yet, Nov. 1st, ratified). The total area included within the limit is close upon 1,000,000 square miles, or more than ten times the area of Great Britain.

The western boundary of the British sphere in South Africa is defined in part by Article III. of the Anglo-German Agreement:—

"In South-west Africa, the sphere in which the exercise of influence is reserved to Germany is bounded:—1. To the south by a line commencing at the mouth of the Orange river and ascending the north bank of that river to the point of its intersection by the 20th degree of east longitude. 2. To the east by a line commencing at the above-named point and following the 20th degree of east longitude to the point of its intersection by the 22nd parallel of south latitute it runs eastward along that parallel to the point of its intersection by the 21st degree of east longitude; thence it follows that degree northward to the point of its intersection by the 18th parallel of south latitude; it runs eastward along that parallel till it reaches the river Chobe, and descends the centre of the main channel of that river to its junction with the Zambezi, where it terminates."

It is understood that under this arrangement Germany shall have free access from her Protectorate to the Zambesi by a strip of territory which shall at no point be less than 20 English miles in width.

The sphere in which the exercise of influence is reserved to Great Britain is bounded to the west and north-west by the above-mentioned line. It includes Lake Ngami. The rest of the western boundary is described in Article IV. of the convention between Great Britain and Portugal, signed in London, August 20th, 1890, but not yet ratified.

"It is agreed that the western line of division separating the British from the Portuguese sphere of influence in Central Africa shall follow the centre of the Upper Zambezi, starting from the Katima Rapids up to the junction with that river of the river Kabompo, and thence up the centre of the channel of the Kabompo."

The coast-line of this immense territory reaches in one continuous sweep from the mouth of the Orange river to Kosi bay, a distance of upwards of 1500 miles. Its eastern boundary is defined by Article III. of the convention (unratified) between Great Britain and Portugal.

"Great Britain engages not to make any objection to the extension of the sphere of influence of Portugal south of Delagoa Bay as far as a line following the parallel of the confluence of the river Pongola with the river Maputa to the sea coast." And further, by Articles I. and II. of the same convention, "Great Britain agrees to recognise as within the dominion of Portugal in East Africa the territories bounded—

"2. To the west by a line which, starting from the above-mentioned frontier on Lake Nyassa (the parallel of the confluence of the river M'singe with the river Rovuma), follows the eastern shore of the lake southwards as far as the parallel of latitude of 13° 30′ S., thence it runs in a south-easterly direction to the eastern shore of Lake Chiuta, which it follows. Thence in a direct line to the eastern shore of Lake Chilwa or Shirwa, which it follows to its south-easternmost point; thence in a direct line to the easternmost affluent of the river Ruo, and thence follows that affluent, and subsequently the centre of the channel of the Ruo to its confluence with the river Shiré. From thence it runs in a direct line to a point half-way between Tété and the Kebrabassa Rapids. The settlement of Zumbo with a radius on the northern bank of 10 English miles remains under the dominion of Portugal. . . .

"To the south of the Zambezi the territories within the Portuguese sphere of influence are bounded by a line which, starting from a point opposite the western extremity of the 10 mile radius of Zumbo, runs directly southward as far as the 16th parallel of south latitude, follows that parallel to its intersection with the 31st degree of east longitude (Greenwich), thence running eastward direct to the point where the river Mazoe is intersected by the 33rd degree of east longitude; it follows that degree southwards to its intersection by the 18° 30′ parallel of south latitude, runs along that parallel westward to the affluent of the river Save or Sabi, which is called the river Mashike, follows that affluent and afterwards the centre of the main channel of the Save to the confluence of the Lunde, whence it strikes direct to the north-eastern point of the frontier of the South African Republic, and follows the eastern frontier of the Republic and the frontier of Swaziland to the river Maputa."

By Article V. of this convention, the islands in Lake Nyassa south of latitude 11° 30′ S. are included in the British sphere.

The northern boundary of this territory is partly defined by Article I. of the Anglo-German Agreement, which thus defines the southern limit of the sphere of Germany in East Africa:—

" . . . it reaches Lake Nyassa (at a point on the parallel of the junction of the river M'Sinje with the river Rovuma), thence striking northward it follows the eastern, northern, and western shores of the lake to the northern bank of the mouth of the river Songwe; it ascends that river to the point of its intersection by the 33rd degree of east longitude; thence it follows the river to the point where it approaches most nearly the boundary of the Geographical Congo Basin defined in the 1st Article of the Act of Berlin, as marked in the map attached to the 9th protocol of the Conference. From that point it strikes direct to the above named boundary; and follows it to the point of its intersection by the 32nd degree of east longitude; from which point it strikes direct to the point of confluence of the northern and southern branches of the river Kilambo, and thence follows that river till it enters Lake Tanganyika."

The rest of the northern boundary of this territory is limited by the "Declaration of the Administrator-General of the Department of Foreign Affairs of the Independent State of Congo, February, 1885," referred to above.

Enclosed in British South Africa are the Orange Free State and the South African Republic,* the boundaries of which have been fixed by various conventions, and which need not be referred to in detail. The western and northern boundaries of the latter are fixed by the convention of Feb. 27th, 1884, on the Zululand side by the Proclamation of June 21st, 1887. The final fate of Swaziland cannot as yet be regarded as settled, while Tonga Land may be deemed as in the British Sphere.

The southern boundary of German East Africa, just described, is fixed by the Agreements of October 26th, 1884, and July 1890. Its northern limits are thus defined in the latter Agreement.

"In East Africa the sphere in which the exercise of influence is reserved to Germany is bounded:—1. To the north by a line which, commencing on the coast at the north bank of the mouth of the river Umba, runs direct to Lake Jipé; passes thence along the eastern side and round the northern side of the lake, and crosses the river Lumé, after which it passes midway between the territories of Taveita and Chagga, skirts the northern base of the Kilimanjaro range, and thence is drawn direct to the point on the eastern side of Lake Victoria Nyanza which is intersected by the 1st parallel of south latitude; thence crossing the lake on that parallel it follows the parallel to the frontier of the Congo Free State, where it terminates. It is, however, understood that on the west side of the lake (Victoria) the sphere does not comprise Mount Mfumbiro; if that mountain shall prove to lie to the south of the selected parallel, the line shall be deflected so as to exclude it, but shall nevertheless return so as to terminate at the above-named point."

On the west, therefore, the German sphere may be regarded as marching with the eastern limit of the Congo Free State as far as the south of Lake Tanganyika.

This brings us to the sphere of the British East African Company. But in passing it may be stated that according to the last Anglo-German Agreement, Germany recognises the Protectorate of Great Britain over the Islands of Zanzibar and Pemba, a Protectorate which the Sultan has accepted. The sphere of the British East Africa Company is thus defined in the Agreement referred to:—

"The sphere in which the exercise of influence is reserved to Great Britain is bounded:—1. To the south by the above-mentioned line running from the mouth of the river Umba to the point where the 1st parallel of south latitude reaches the Congo Free State. Mount Mfumbiro is included in the sphere.

"2. To the north by a line commencing on the coast at the north bank of the mouth of the river Juba; thence it ascends that bank of the river and is conterminous with the territory reserved to the influence of Italy in Gallaland and Abyssinia as far as the confines of Egypt.

"To the west by the Congo Free State, and by the western waterparting of the Basin of the Upper Nile."

This virtually includes a large part of Victoria Nyanza, the whole of Uganda and Unyoro, and part of Karagwé, Lakes Albert and Albert

* Hence the colouring is slightly different from other independent or quasi-independent States.

Edward, and the countries on their shores, as well as Emin Pasha's Province, part of Darfur and Kordofan. Of course it remains for the British East Africa Company to take advantage of the agreement, and supplement it with treaties by native chiefs, and possibly also by an arrangement with Egypt with reference to the Sudan.

The Italian sphere of influence is recognised as extending on the East Coast from the Juba river to the neighbourhood of Ras el Khyle, by virtue of arrangements with the British East Africa Company, and treaties with native chiefs within the last two years. But the sphere of Italy in Africa is at present under the consideration of a joint commission. It will have to be adjusted with reference to the British sphere on the Somali Coast, from the entrance of Tajurah Bay to Bunder Ziahdeh (Protectorate established 1887), including the Island of Sokotra, formally annexed October 1886. For unintelligible reasons the British protectorate has not yet been carried round Cape Guardafui as far as Ras Hafun. The interior limits of the British Somali Protectorate remain to be adjusted. Where it ends in Tajurah Bay, the French Protectorate of Obock begins. This was acquired in March 1862, but actually occupied only in 1883. By treaties with native chiefs, the Protectorate extends over an area of 2300 square miles.

Italy's first possession in Africa, in Assab Bay (240 square miles,) was purchased as a coaling station by an Italian shipping company, from the Danakil chiefs in 1870, and taken over by the Italian Government in 1880. Italian claims have since been gradually extended along the Red Sea coast by treaties with native chiefs, and, with the tacit assent of Great Britain, from Cape Kasar (18° 2′ N.) to the southern limit of the Sultanate of Raheita (12° 30′ N.). This tract comprises Massowah and its territory, with the neighbouring Dahlak Archipelago. In 1889 an arrangement was concluded with the King of Abyssinia, whereby the whole of that country, including Shoa, was placed under Italian protection, so far as foreign relations are concerned. There has, however, been as yet no international arrangement respecting Italian claims; so far as Great Britain is concerned, these will no doubt be placed on a definite footing by the joint commission referred to. It need only be said that by the recent Anglo-French agreement Madagascar is recognised as within the French sphere, while the Comorro Islands were taken under French protection in 1886.

Thus it has been sought to show how far Africa has been partitioned among the European Powers. Including the independent Central Sudan States (and of these it is to be mentioned that the Niger Company is in close relations with Bornu), the undisposed-of Sahara (south of Tripoli and Morocco), and excluding the Italian claims, and accepting the Anglo-Portuguese agreement, it is doubtful if there are more than two million square miles open to disposal by international arrangement or otherwise, that is, about one-sixth of the whole continent.

It is difficult to estimate the area of the territories claimed by each European country. Out of the 11,900,000 square miles of Africa, probably the share of Great Britain is not less than two million square miles. This includes the Niger territories and the region naturally coming under the sphere of the Company, some of the most hopeful districts of tropical Africa; while in the Great Lake Region and the Upper Nile countries the British East Africa Company has a sphere capable of great development. In British South Africa again, we have obtained that section of Africa most adapted to European colonisation, rich in minerals and agricultural possibilities. All but a fraction of the German area (about a million square miles) is within the tropics, and includes a great percentage of desert and valueless country. Portugal, with about half-a-million square miles, possesses, especially in West Africa, much territory requiring only energy assisted by labour and capital to yield profitable returns. Of the Congo Free State (about a million square miles) a purely tropical region, it is difficult to make any prediction. Including Algiers and Tunis (both favourable to European enterprise), and the Hinterland accorded to her by the recent agreement, along with Madagascar, the whole of the Senegambia territories, and those on the Guinea Coast, France may claim an African empire of about 2,500,000 square miles, much of it requiring enormous expenditure to convert it from the desert condition. If the whole of Italy's claim be admitted, her African possessions will cover 340,000 square miles. Egypt, the Egyptian Sudan, Tripoli, Morocco, and the Sahara in the south, the Spanish territory on the north-west coast, the country to the east of the German Cameroons, make up the balance not expressly disposed of. It would be out of place in these pages to forecast their fate; but it seems evident that the partition, begun six years ago, is likely to be concluded before many more years are passed.

J. Scott Keltie.

GEOGRAPHICAL NOTES.

Explorations in West Africa.—Considerable additions to our geographical knowledge as well as to other branches of science may be expected from the labours of the expeditions which will soon be on foot in the interior of the West Coast of Africa, engaged in the work of surveying the frontier countries between British territories and those of France and Germany. One, under Dr. R. A. Freeman who has already had much experience in the interior of Ashanti and the countries beyond its northern frontier, left for Accra last month. Two others, under the command of Major W. Peacocke, R.E., and Captain Kenney, R.E., leave early in the present month for Sierra Leone and the

Gambia, respectively. The British parties will co-operate with commissioners of the other powers concerned, and the work will necessarily extend into interior districts of which little or nothing is at present known.

Death of Sir Richard Burton.—Captain Sir Richard F. Burton died at Trieste on the 20th of last month. In him we have lost one of the greatest and most accomplished travellers of our generation, the pioneer in the long series of discoveries in the Lake Regions of Equatorial Africa. An account of his life and chief explorations must be reserved for our next number.

Mr. Arnot's Expedition to the Garenganze Country in Central Africa.—Mr. F. S. Arnot's second expedition from Benguella to Garenganze, on which he started in June 1889, has been stopped at Bihé, owing to the disturbed state of the country, and he has been obliged to return to the coast, leaving his party at Bihé, in order to renew his supplies and make a fresh start. In a letter to his family he says he was well received by the Portuguese Governor-General, to whom he delivered the effects of the deceased traveller Silva Porto, and expected to be able to start for the interior on the 8th of August. He had heard on the way down to the coast that the Portuguese were blaming him for being the cause of the revolt at Bihé and their expulsion from that place, and that they were threatening him with arrest, but the rumour proved to have no real foundation.

Dr. O. Baumann in Usambara.—An account of the continuation of Dr. Baumann's surveys in Usambara * is given in the current number of 'Petermann's Mitteilungen,' in a letter dated 31st July, 1890, from Korogwe, from the traveller himself to Dr. Hassenstein. Dr. Baumann's exploration of the South Paré Mountains occupied fourteen days, the line of route being in a zigzag from south to north, and crossing the main ridge five times. The range is not broad; in the north and south it consists merely of a crest line, but in the middle it broadens into a rolling table-land, covered with extensive virgin forest. Below this table-land there are high meadow-lands, where the fine, short-horned Paré cattle find excellent pasture. The abodes of the Wapare lie scattered in a belt about midway between the slopes, and reminded the traveller of the Chaga dwellings. The country is open, well-watered and cultivated, and artifically irrigated by numerous channels. The western slope is, speaking generally, poorer in water and less fertile than the eastern, which receives the moisture-laden sea winds. The Paré range consists mostly of crystalline rock running north and south. All the brooks bring down iron-dust; the smelting of iron is not confined to the Wagueno people. From the high ground the traveller observed that the Kinsuani river, noted by Kersten, is a

* 'R.G.S. Proceedings,' 1890, p. 615 *et ante.*

northern affluent of the Mkomasi. On the Ruvu side he descried between this river and the Kibaia Mountains in the Masai Plain, a lake basin, Lake Kiniarok, which appeared to be of considerable proportions. From the southern end of the Paré Mountains the traveller following the right bank of the Pangani at some distance, proceeded to Useguha and to Mgera in North Nguru; on the way he was attacked by the Wasegua. From Mgera he marched to Panghai and Kilwa, thus connecting his surveys with those of Last,* and then returned through Useguha by another route. Dr. Baumann intends, after having explored the country nearer the coast, to embody his surveys in a map, which will be an important addition to the cartography of the northern part of German East Africa.

Results of MM. Grum-Grijmailo's Explorations in the Eastern Tian Shan.—The brothers Grum-Grijmailo have reported in detail to the Imperial Geographical Society of Russia the results of the first portion of their journey in the Eastern Tian Shan.† It appears that our maps of the northern slopes of the Tian Shan range are full of errors. The Kiityka Pass has no existence; the Mengete Pass conducts from the basin of the Kash into that of the Shusta, whence the route turns, not to the north, but to the south-east, joins the route coming from the winter pass of Ulan-ussu, and then leads to the pass of the Keldyn, and finally to the Jullus or Sullus. To the north of this route rises the magnificent knot of mountains called Doess-meghene-ora, the discovery of which by the expedition was announced in the last number of the 'Proceedings.' In this mountain mass, with the ranges branching off from it, lie the head-waters of the rivers Khorgos, Ulan-ussu, Shusta (which is an immense stream, known as the Manas in its middle course), Shindsha-cho, Jullus, Kash, and other smaller streams. A grand prospect over the six peaks of Doess-meghene-ora was obtained from a summit of the Manas range; the peaks are not visible from the valleys of the Kash and Jullus, being hidden by the Keldyn range. The altitude of Doess-meghene-ora is now stated to be over 19,700 feet (6000 metres) instead of 21,500 feet as previously announced. The masses of snow clothing its summits are very great, but the glaciers are not of importance, on account of the precipitous nature of the sides of the main mountain mass and of its offshoots. Along the route from Atschal to Urumtsi the Tian Shan forms an inaccessible wall, which is crowned with an almost unbroken line of snow. The base of the northern slope of the range, which in the meridian of Dshin-cho-shicho is inconsiderable, increases further east, and in the meridian of Manas reaches its greatest extent, just at the point where the mountain system of Doess-meghene-ora develops. The expedition visited some

* See 'Proceedings,' 1882, p. 148 and map.

† 'R.G.S. Proc, 1890, p. 616.

coal-mines. Incrustations and sulphur crystals were visible everywhere in the valleys. Nearly all the rivers of the Tian Shan bring down gold, which is obtained from the river-deposits, but not from other strata or from quartz veins. The Tian Shan is uncommonly rich in vertebrate animals, but much poorer than the Pamir in birds and insects, in consequence of the want of variety in the flora. Eight points were fixed by astronomical observations.

The Exploration of Lake Toba (Sumatra.)—It is announced that the well-known Italian zoologist, E. Modigliani, author of the 'Viaggio a Nias,' commenced in July last a journey to Sumatra, for the purpose of exploring the vicinity of Lake Toba, the topography of which is still so little known.

On the Teaching of Geography in Russia.—In a paper on this subject read at the Leeds meeting of the British Association, Dr. Hugh Robert Mill states:—The teaching of geography in Russian schools is in accordance with an official syllabus enforced by Government. During a recent visit to Russia the author procured copies of the chief class-books, a summary of the contents of which formed the substance of the paper. A set of three books by K. Smirnoff embodies the general part of the syllabus. The first is a general summary of mathematical, physical, and political geography for lower schools, in which physical geography is treated as a description of the configuration and climates of the earth, thus avoiding the tendency to discourse on general physiography under this name. A series of original and remarkably ingenious diagrams illustrates the letterpress. In one the relative sizes of lakes is shown by giving on one sheet, drawn to the same scale, all the inland waters from the Caspian Sea to the Lake of Constance, grouped under their respective continents. Another serves to show the double relation of climate to altitude and latitude in the northern hemisphere. The second book pertains to the gymnasial course, and treats of the geography of 'Asia, Africa, America, and Australia, considered physically, ethnographically, and politically'; while the third treats of extra-Russian Europe in the same way, commencing at the Balkan Peninsula and working north-westwards to the British Islands. Both these are volumes of about 150 pages, with numerous statistical diagrams showing the relative areas and populations of countries in a graphic form. There are maps in black and white of the continents and chief countries, and these are usually in pairs—a physical and political. They are clearly cut, uncrowded, and names as a rule are replaced by contractions, to which there is a complete index opposite each map This series, while unattractive and designed from a standpoint very remote from that of Western Europe, appears to be systematic and complete. The last subject in the higher school course is the geography of the Russian empire, a textbook on which, by E. A. Lebadeff,

contains 196 pages of letterpress and a large coloured map of European Russia. The exceedingly unattractive nature of Russian geographical teaching is fully illustrated by these books; and instances came to the author's knowledge of absurd confusion of ideas in consequence of the habit of viewing Asia rather than Western Europe as the next neighbour of Russia. A small treatise by P. Beloch must be accorded a distinctly higher place educationally than the foregoing. The preface describing the plan of the work may be quoted:—"According to the plan followed in an elementary course of general geography, attention is first given to the development of the pupil's knowledge of the immediate locality with which he is most familiar. Then, after being accustomed to representations on paper of the places he sees about him, the pupil acquires information, both on the map and practically, about the surroundings of his residence to the limits of the visible horizon. The use of maps is taught from the beginning, and, after this is fully understood from the visible examples, it is extended so as to afford a general knowledge of the whole fatherland. Finally a brief review of the entire terrestrial sphere is given, adapted to serve as an introduction to more advanced courses in earth-knowledge." The method is applied to St. Petersburg, and the description is enforced by maps:—(1) A large-scale plan of the city and islands; (2) a smaller scale map of the district visible from the church towers, extending to 30 versts; (3) a map on still smaller scale, taking in the whole country within a radius of 300 versts; (4) the Russian empire; and (5) European Russia on a very small scale. Notes follow showing how to adapt the system to any locality. Judging from the small amount of space allotted to the birthplace and fatherland, the execution of the design is not equal in value to its conception. Russian school atlases are clear, accurate, and cheap. Most of the space is naturally given to the Russian empire and Central Asia, which rarely figure to any extent in the atlases of other nations. Both in books and in maps remarkable prominence is given to ethnography, and it may be said that in the mind of Russian geographers political geography presents itself as a function of physical geography and ethnography.

The Population of Denmark.—According to the preliminary results of the census taken in Denmark in February of this year, the total population amounts to 2,185,159, consisting of 1,065,447 males and 1,119,712 females. The yearly increase during the past decade has been at the rate of 0·99 per cent. The town population forms over one-third of the total. The increase in the population of the capital has been very remarkable, having been at the rate of 3·7 per cent. per annum, and the present population of Copenhagen with its suburbs amounts to 375,251. Aarhus has 33,308 inhabitants; Odense, 30,277; Aalborg, 19,503; Horsens, 17,290; Randers, 16,617; Helsingör, 11,802; and Fredericia, 10,044.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

LEEDS MEETING, 1890.

(*Concluded from p.* 635.)

Friday, September 5th.

Notes on the Country lying between Lakes Nyassa and Tanganyika By Dr. W. Kerr Cross.—Will be published in the next number of the 'Proceedings.'

Journeys in Ashanti and Neighbouring Regions. By R. Austin Freeman, M.R.C.S.—This paper will be published in a subsequent number of the 'Proceedings.'

Zambezia. By E. A. Maund.—'Proceedings R.G.S.,' *ante*, p. 649.

The Commercial Geography of Africa. By J. Scott Keltie.

The Political Partition of Africa. By A. Silva White, F.R.S.E.

A Journey in the Kalahari. By E. Wilkinson.

Monday, September 8th.

Joint Meeting with Section F, to consider the Subject of the Lands of the Globe still available for European Settlement. The subject was introduced in a paper by Mr. E. G. Ravenstein, which will be published in a subsequent number of the 'Proceedings,' with accompanying maps.

Explorations in North-eastern Cilicia. By J. Theodore Bent.—This paper will be published in a subsequent number of the 'Proceedings.'

Report of the Committee for the purpose of investigating the Geography and the Habits, Customs, and Physical Character of the Nomad Tribes of Asia Minor and Northern Persia, and to excavate on sites of ancient occupation. Report to the Committee by Mr. J. Theodore Bent (Secretary).—The substance of this Report was given in Mr. Bent's paper on "Cilicia Tracheia" in the August number of the 'Proceedings.'

The Physical Geography of Brazil, and its bearings on the Industrial Development of the Country. By J. W. Wells.—The purpose of the paper was to point out the contrast between the configuration of the land of Argentina and of Brazil: how in the former it is so extremely favourable to the rapid and inexpensive extension of railways; whereas in the latter country it has long been an obstacle to similar progress. Now that such obstacles have largely been overcome, there is every prospect of a speedy construction of a vast system of rail and fluvial communication over the vast area of Brazil—a result which will be, and, as a matter of fact, actually is, the means of attraction of a considerable number of desirable immigrants. And railway construction, and a free and abundant immigration, inevitably lead to the development of all sorts and conditions of industries, and prosperous commerce.

Explorations in Eastern Bolivia and the Gran Chaco. By M. A. Thouar.—M. Thouar confined himself to giving a brief outline of his four journeys in the immense region of the Gran Chaco, mentioning only the chief features of interest which he himself has observed, during his explorations, which commenced at the time of the

massacre of the Crevaux mission in 1882. His first journey was made under the auspices of the Bolivian Government in 1883, when he explored both margins of the Pilcomayo river from Bolivia to the river Paraguay. The second, in 1885, under the auspices of the Argentine Government, was devoted to an overland exploration of the delta of the Pilcomayo lying in the Argentine territory, as far as the rapids observed by Feilberg, returning by the Pilcomayo on a raft to the Paraguay. The third, in 1886, under the patronage of the Bolivian Government, was made in a northerly direction from Rosario to Salta, reascending the Humahuaca and the Cordilleras, exploring the Upper Pilcomayo above the cataract of Guarapendi or Pirapo. The fourth, under the auspices of the Bolivian Government, when he explored the Parapiti, the Izozog, and all the central part of the Northern Chaco for the purpose of discovering a navigable route eastward for the commerce and production of Bolivia.

The Gran Chaco is situated between the 18th and 30th parallels S. lat. and 57th and 63rd degrees of long. W. of Greenwich, and is divided into three sections. The most northerly is called the Chaco Boreal, and is situated between Chuquitos and the Pilcomayo, and contains an area of 80,730 square miles. The Chaco Central is situated between the Pilcomayo and Bermejo, and contains 71,996 miles. The Chaco Austral lies between the rivers Bermejo and Salado, and contains 77,625 square miles.

The whole is an immense sandy formation, sloping from north to south, and inclined from W.N.W. to E.S.E. At Formosa, on the Paraguay and Caiza, at the foot of the Andes, the difference in the altitude is only 656 feet. The surface is uniformly flat, except the region in the Chaco Boreal, which divides the basin of the river Parapiti from that of the Pilcomayo. In the north-west corner of the Chaco Boreal runs the Parapiti, which descends from the Andes and waters the province of Izozog. In the wet season its volume is very considerable, but in summer it dries up rapidly. Running from W.S.W. to E.N.E., it forms the beautiful lake Ancararena, from which it issues considerably diminished in volume, and has a changing course to Chiquitos. In the centre of the Chaco there are two beautiful salt-water lakes, San José and Santiago; otherwise, lakes or ponds are rarely seen, the water being so quickly evaporated, or absorbed by the soil.

The climate is warm in summer and temperate in winter; the maximum reached is often 104° F. in the shade during the months November to April. The minimum falls sometimes below 26° F. from June to August. The prevailing winds blow either from the north or from the south, the former being very hot, and the latter cool, and the meeting of the two currents at the end of their season is always accompanied by torrential rains, which in a few hours cause a fall in the temperature varying from 10° to 15°. It is very rare to note a storm coming from west to east, or vice versâ, and in consequence a severe drought is often experienced. The mean temperature of the Chaco Boreal is 71° 6′ F., the fluctuation of the hypsometer varies between 98° 68′ and 98° 90′.

The Pilcomayo takes its course in the high Bolivian plateaus in the vicinity of Potosi. It traverses the eastern slope of the Andes and enters the Chaco at the mission of San Francisco de Solano, 21° 16′ lat. S. and 63° 20′ long. W. of Greenwich, and enters the Paraguay opposite the Cerro Lambare 25° 20′ 32″ lat. S. and 57° 36′ 15″ long. W. of Greenwich. It receives several tributaries in the highlands of Bolivia, the most important being the Pilaya and the Cachinayo, its current is here very impetuous and intercepted by rapids, the most important being the Guarapetendi. Its course between Iambare and San Francisco is 840 miles, and the fall between those stations 1400 feet. The width of its banks varies from 674 yards to 45 yards. The right bank is 19 feet and the left 22 feet above the water. The depth in the driest season is never less than three feet. More favoured

than his predecessors, M. Thouar has traversed its course on different occasions from Bolivia to the Paraguay, and has satisfactorily proved that the Pilcomayo runs in continuity the whole year, and is not lost in the plains of the Chaco as some travellers have stated.

Respecting the Indians, the Tapuis Indians occupy the region called Izozog, on both sides of the Parapiti, from Carumbei to the Parapiti. They are a branch of the Guaranis tribe, have the same habits and language, and devote themselves to agriculture. Immediately to the south of them are the Chiriguanos, who occupy all the territory of the Missiones from Machareti to Aguarrenda. All these Indians, although uncivilised, are becoming completely submissive. In the north, in the thickest part of the Boreal forests, dwell the Sirionos, or Itiru Coimbae, or Guarinocas, or En Pelotas, who go about entirely naked, and are in a state of complete savagery. They are tall and strongly built, but the body is bent nearly double in consequence of the posture they adopt in penetrating the thick forest. They lay in wait for the traveller, and try to take him by surprise when sleeping. Their arms consist of a spear and a club six feet long. Of all the Indians who live in the Chaco it must be observed that none are cannibals, and they ignore the use of poisoned darts. The Sirionos live almost exclusively on honey, which is exceedingly abundant, and the plant they call Cipohi—*cipo* plant, *hi* water.

On the banks of the Pilcomayo, on the left, are grouped the Tobas, the Charotis and the Tapihetes, on the right bank the Matacos, the Noitenes, the Guisnayes, and the Tobas. All these tribes much resemble each other. They make fermented drink from the Algaroba, which intoxicates them, and then they become warlike. They believe in a Superior Being, whom they represent by the sun.

From the foot of the Andes throughout the whole of the Chaco Boreal to the river Paraguay, it is one immense ocean of forest, in which the Quebachos and Algaroba trees predominate. The Bromeliaceæ family is well represented, and their fibres are turned to good account by the Indians in the manufacture of nets, baskets, hammocks, &c. After them the cacti of all sizes and dimensions, which with the Duraznillar, a kind of Polygonacea, form an impenetrable barrier, through which one can hardly make his way with the *machete*. Near the banks of the rivers the palms are met with, and also a kind of myrtle, the arrayan, the leaves of which make an excellent tea. The ramie plant, the fibres of which are now attracting much attention, is also found, and the palo santo or lignum vitæ, guayacan, lipachos, and many other hard indestructible woods. In the south, in the vicinity of the Pilcomayo and the Chaco Central, pasture grounds abound.

The carnivorous animals are represented by the jaguar, the puma, the wild cat, the aguara (*Canis jubatus*), and a species of fox. Many varieties of deer are found, as well as the tapir, peccari, capybara, &c. The condors, the vultures, urubus, gallinazo, and the carancho represent the birds of prey; while paraquets, parrots, and all varieties of ducks, storks, cranes, herons, flamingoes, and ibis abound.

In conclusion, the efforts of both the Governments of Bolivia and Argentina have been to unite the eastern and southern departments of the former to the latter country by means of a railroad across the Chaco. The oft-deferred question of boundaries has now been decided; the navigation of the river Pilcomayo, as also the construction of the railroad projected between Formosa and Caiza will bring to the markets of Europe the immense and varied productions of the Chaco, as well as developing the rich gold and silver regions at the source of the Pilcomayo, to the mutual benefit of both countries.

Tuesday, September 9th.

Some Notes of a Journey in Ruthenia. By Miss Menie Muriel Dowie.—Miss Dowie's paper dealt with her experiences among the people who inhabit the Carpathian mountains on the Eastern or Polish side. She gave a brief description of the life of these people, their work, costume, and character, and included an account of her journeys, alone, on horseback there, the mountains, and the conditions under which she was obliged to live. She concluded with some remarks upon the future of Galicia and its great natural resources in the shape of petroleum wells, salt and silver mines, together with the immense industries in connection with its woods, yet to be fully developed.

On the Present State of the Ordnance Survey, and the paramount necessity for a thorough Revision.—By Henry T. Crook, C.E.—In his presidential address to this section at the Brighton meeting, eighteen years ago, Mr. Francis Galton dwelt on the comparative neglect and indifference which the public showed to the work of the Ordnance Survey.

In proportion to the area of which Government maps are procurable the demand for the maps at the present time, judged by the sales has not increased. It would seem, therefore, that the productions of the Survey have become less instead of more popular since the time when Mr. Galton drew attention to the matter. In a scientific age, when the purposes for which accurate maps are required are ever increasing, the falling off in the sales of the national maps, for the making of which the country has paid an enormous sum of money, is to say the least a startling phenomenon. Nearly twenty years ago, estimating from the annual value of the maps sold at that time, General Sir Henry James thought that when the Survey was completed (which in theory at all events it is now supposed to be) the yield from sales would be at least 30,000*l.* per annum, whereas for the year ending last December the value of sales only reach the paltry amount of 13,164*l.*, whilst the value of presentations to public departments and Government institutions and under the provisions of the Copyright Act amount to nearly 6000*l.* It would be difficult indeed to find a parallel for a work of equal magnitude and importance yielding such disappointing results. The partial failure of our great national cartographical institution to realise the legitimate expectations formed of it seems a proper subject of inquiry for the British Association, one of whose objects is the removal of disadvantages impeding the progress of science. There are only three ways in which this condition of things can be explained They are :—

1. That even with the schoolmaster abroad the present generation requires fewer maps.
2. That the maps are not accessible, and therefore not known.
3. That the maps do not meet popular requirements.

The first explanation is obviously untenable; there is a good deal to be said for the second ; but after careful examination and inquiry I have come to a decided conclusion that there is far more importance to be attached to the third. Speaking of the one-inch maps only, Mr. Galton said, "It is much to be regretted that these beautiful and cheap maps are not more accessible. They are rarely to be found even in the principal booksellers' shops of important country towns, and I have never observed one on the bookstall of a railway station. Many educated persons seldom, if ever, see them; they are almost unknown to the middle and lower classes; and thus an important work made at the expense of the public is practically unavailable to a large majority of those interested in it, who when they want a local map are driven to use a common and inferior one." This can be more truly said of the large-scale maps than of the one-inch, which is the only one at all popularly known, and,

in fact, is often spoken of as *the* Ordnance map. The latter is by far the most important of the series to the bulk of the map-using public, and something more than the mere difficulty of obtaining it is required to account for its unpopularity.

We cannot arrive at a right conclusion as to what it is that stands in the way of the full and complete utilisation of the Ordnance Survey, unless we take into consideration its work as a whole. The department has attempted or has been directed to undertake far more than it had the means to carry out in any reasonable time. The cadastral surveys have, during recent times especially, occupied the chief share of the department's energies, to the exclusion or indefinite delay of the original and more popular work. It has almost abandoned cartography for land surveying—maps have given place to plans. No one, in these days, will dispute the advisability of carrying out the parent survey on the largest required scale, but, like most scientific undertakings, the survey has suffered severely from constant Parliamentary interference; the scope of the undertaking has been enlarged without a corresponding increase in the establishment and in the annual grant. Since the general lines upon which the work was to proceed were finally determined in 1863, the chief difficulty has been with the throttle-valve of the Treasury; the result is that after more than a century's existence the department has not yet completed one of its works. Apart from mere skeleton or index maps, it has not yet produced on any scale a uniform map of the British Isles.

A generation has elapsed since the completion of the great triangulation, and yet of the original scheme, the one-inch hill-shaded map of the kingdom, there still remain to be completed 30 out of the 131 sheets of Scotland, and 25 out of the 205 comprised in Ireland. The six-inch map commenced in Ireland in 1825 is the nearest to completion: it is stated that it will be finished early next year. The 1:2500 map, commonly known as the 25-inch, the true cadastral survey, was commenced in 1854; considering the magnitude of the task, it has so far been executed more rapidly than any, but still a great deal remains to be done. The important counties of Lancashire and Yorkshire, several counties in Scotland, and almost the whole of Ireland, excepting Dublin County, have still no maps on a larger scale than six inches to the mile. It has, in fact, only just been decided to re-survey Ireland on the 25-inch scale. In those districts where the one-inch map had not been published, the change, first to the six-inch and then to the 25-inch for the parent survey, necessarily delayed the publication of maps on the smaller scales until the introduction of the photographic and photozincographic methods of reduction and printing. Still one cannot fail to be struck by the phenomenal slowness of production which has characterised the work as a whole. In consequence of the length of time which it has taken, and the neglect to provide for a timely revision, the major portion of the maps are obsolete and of little more than historical interest.

No one who knows anything of the subject questions the original accuracy and finish of most of the maps which the Ordnance Office has produced, or of the valuable work which has been done in the advancement of geodetical and astronomical science. It is necessary to say this, for it has frequently been charged against those who have from time to time presumed to criticise the work of the Survey that they have been oblivious of these things. At present we are concerned merely with the question why the maps are so little utilised, and the reasons for the apparently low estimation in which they are held by the public. Stated in the probable order of their importance, I think the reasons may be tabulated thus:—

A. The maps fail in many cases to meet the requirements of the classes of users for which they are presumably designed, on account of—

(1) Age. For want of revision large portions of even the 25-inch, but more

particularly the six-inch and one-inch maps, are very incorrect, and in many cases quite obsolete.

(2) Bad impressions, or impressions from old and worn-out plates.

(3) Complexity (in the one-inch map) through overcrowding of detail, causing confusion, the map being printed in only one colour.

(4) Deficiency in information as to ground forms, particularly in the six-inch map (excepting Lancashire and Yorkshire).

(5) Want of uniformity.

(6) High price, especially in the case of the six-inch quarter sheets, and on all scales where sheets are partially blank.

(7) Lack of explanatory information with the maps.

B. Inaccessibility. The general public knows little or nothing about the maps because of—

(1) The system of sale.

(2) Bad indices, and absence of information as to age and style of maps published of particular districts.

It is impossible to estimate the separate effect of each of these defects in the maps and in the means of distribution, but a few examples will establish the fact of their existence, and the way in which they operate in depreciating the value and checking the sale of the productions of the Survey.

Suppose, for instance, a member of this Association coming to Leeds desires a handy map of the district, and turns to see what the Ordnance Survey provides for him. He will find the town of Leeds is in the south-west angle of sheet 70 of what is facetiously called the new one-inch hill-shaded map, date 1858. He will be able to obtain the sheet to the west of the same series, but for the southern half of the desired map he will have to fall back upon two sheets of the old survey, dated 1841-3, much inferior, of a different shape, containing only three-quarters of the area of the new sheets, but equally expensive. The resulting map is eminently unsatisfactory ; it shows defects 1, 2, and 5 very conspicuously. To the environs of Leeds as they are to-day it is no guide whatever. So far as the ground forms are concerned the two upper sheets are good enough, but in the two lower the hill-shading has practically vanished, and in many places the roads and rivers are fast fading away also. The plates are obviously quite worn out.

Let us now look at the English Lake district. Here, at all events, if the maps meet popular requirements, they ought to be in constant use. But what do we find? Traverse the Lake district from one end to the other, you will see plenty of maps of all kinds in use, but seldom indeed will you find that any one of them is an Ordnance map.

Here are four sheets, 29, 30, 38, 39, again of the new series, though this time the date is only a quarter of a century back. Defects 1, 2, 3, and 5 are all more or less noticeable.

Here the want of uniformity is not in the age and style or shape of the sheets, but in difference in depth of shade of the impressions. It may be said that by careful selection the sheets might be better matched—possibly so, at the Survey stores. This is the best the agent could do ; it is a fair specimen of what the public gets, and therefore one by which the Survey must be content to have the productions judged. The hill-shading, particularly in the Coniston sheet, has become quite woolly, consequently the hill forms are deficient in relief and character. A very large proportion of the names are unreadable, and the plate seems to have been injured in places by the erasure or alteration of some of the figures denoting the heights of mountains. The roads and footpaths are very indistinct, and some of the most frequented are not even shown. I have recently compared the maps of

this district by Bartholomew in a well-known guide-book, and for pedestrian purposes, bald as they are, they are more useful than the Ordnance maps.

The important question of price also comes in. The Ordnance sheets alone cost 4*s.*, but to be any use they must be made up in a portable form, which can only be done by sectioning and mounting. Thus, before the Ordnance map of this district can be utilised, an outlay of 7*s.* 6*d.* is required, a sum sufficient to buy two copies of a good guide-book with all its maps. Can we be surprised, then, that the public do not buy the Ordnance maps ?

Sheet 38 is printed from an electrotype taken in 1882. I do not know at what date the plan of keeping the original plate or the first electrotype matrix was introduced, and it may be that the plates of these sheets, for which at one time there was a great demand, are much worn, which would account for the fact that the Lake district sheets now sold are some of the worst of the new series of the northern counties. Compare, for example, the Hawes sheet, No. 50, which retains nearly all its original beauty and crispness of definition in the ground features.

If it be of the south of England that we require a topographical map, we shall fare no better, rather worse. Last year I required a map for the Volunteer manœuvres in the neighbourhood of Eastbourne. There is no map suitable for military purposes, that is, showing the ground features, of more recent date than 13. It is one of the earliest maps of the Ordnance Survey, published at the Tower by Colonel Mudge. For the time of its execution, undoubtedly a most creditable piece of work, curiously enough it is in a better state so far as regards definition than the maps of the Lake district made fifty-two years later: but speaking from experience, I can say that the ground features are by no means correctly delineated. This can be proved by another sheet, No. 8, also done under the direction of Colonel Mudge, and evidently by the same hand, when a comparison can be made with the new hill-shaded map. From about 1830 onwards, the hill-shading much improved, and has continued to improve until it can now be fairly claimed that maps recently issued are unsurpassed in this particular by the productions of any country, but it is no satisfaction of the claims of inhabitants of Sussex to be told that they can have an exquisite map of the Western Highlands of Scotland, and no one will maintain that these maps of sixty to eighty years ago answer the reasonable requirements of to-day. Towns, such as Eastbourne, Hastings, St. Leonards, and Newhaven, are shown as mere villages. It is upon an entirely different England we are gazing in these sheets, and one is inclined to resent the attempts made here and there to modernise them by addition and alteration; the railways especially seem a shocking anachronism. Such additions and alterations destroy the real value of the maps as antiquarian documents. In this connection it is particularly interesting to note the disappearance of the commons and the village greens in comparing the new and the old maps.

Why should the public buy these maps when it can get maps at one-quarter the price, which, for most purposes, are as useful, and, what is of greater importance, up to date? The truth is that of the whole of the southern counties of England (except in the few places where the new hill-shaded map is published) no topographical map worthy the name exists, and for the remainder of England and Wales, where it does exist, its antiquity robs it of much of its utility, and the plates of populous areas are worn out. The so-called new survey, north of the line Preston, Leeds, Hull, we have seen is from twenty-five to thirty-five years old; whilst the few sheets published of Surrey, Kent, and Hampshire, are from surveys at least twenty years old. The more recent sheets published of this map do not bear the date of the survey. The Aldershot sheet, for example, published in 1878, is from a survey of 1870–71. Reference has to be made to the six-inch map to obtain

this information. This is not fair to the purchaser, who, in most cases, is ignorant of the internal arrangements of the Survey, and imagines the map to be corrected up to or within a short time of the date it bears.

The new one-inch map, published without the hill features, called the outline map, gives no idea of the nature of the ground. Only contours of each 100 feet are given, and these are so fine drawn as to be barely visible. Even without the hill-shading this map is often so crowded with detail that it is very confusing and difficult to read. Take, for example, sheet 28.

Many sheets are spoilt by the number of names of parishes and boundaries which might very well be omitted from both the outline and hill-shaded one-inch maps. Of the 360 sheets comprised in the new one-inch map of England and Wales, 179 have been published in outline and 81 with the hills shaded. The outline map cannot be considered anything more than a stop-gap publication. It is true the Director-General says the outline map appears from the numbers sold to be more popular than the hill-shaded. One is loth to assume that the ignorance of topographical representation in this country is so great that there is a preference for the sweet simplicity of a map giving practically only the horizontal development of the ground over one representing both the horizontal and vertical configuration. But it can easily be understood that an outline map from a survey of 1870 may be preferred to a hill-shaded one of 1813, which, as we have seen, is the only choice open to a Sussex man. There is a danger, too, in the publication of the outline map which may be overlooked, and that is that the Treasury may consider it an excuse for still further delays in the publication of the topographical map. Looking at the return for the last four years, it would appear as if advantage had already been taken for that excuse. Here is the return :

ENGLAND AND WALES, 59,540 SQUARE MILES.

New one-inch map. State of publication.

Year ending.	Total area completed.		Area completed during year.	
	Outline.	Hills.	Outline.	Hills.
Dec. 31st, 1886	18,616	11,544	432	52
„ 1887	24,150	11,955	5,534	411
„ 1888	25,101	12,524	951	569
„ 1889	29,478	12,524	4,377	Nil

This table shows that last year the hill-shaded map was not advanced at all, whilst the maximum rate any time during four years has been two or three sheets per annum: at this rate the map will be completed towards the close of the next century. Fortunately the case is not quite as bad as it would seem to be from the present rate of progress. In his last report the Director-General estimates that it will be completed in 1925. Any way we shall have to wait for nearly a generation before we shall be in possession of a complete and tolerably uniform topographical map of the United Kingdom. Surely such a statement by itself is sufficient to condemn the system by which the Treasury doles out the grants for each map bit by bit.*

* In consequence of the limited sum spent on it annually, the hill-shaded map of England and Wales alone will have, when completed, occupied 53 years in the making.

The deficiencies of the one-inch map have been treated at some length, because it is the most important from the particular point of view. Most of the defects it will be seen are due to the age of the maps and the want of revision, and the same will be found to hold good of the six-inch and larger scale maps.

The six-inch or county map has undergone more vicissitudes than any other of the Ordnance series. The maps of the counties in England and Scotland first surveyed on this scale are the finest productions of the Survey (for examples see sheets 78 and 79 of Lancashire). Commenced in a style which soon aroused the attention of the economists in Parliament, it was stopped in 1851. Then came the battle of the scales, after which the 1:2500 scale was finally adopted as that of the parent survey. When ultimately it was decided to resume the publication of the six-inch map by reduction from the larger scale, it was with a greatly reduced number of contour lines. Unfortunately, it appeared to the Commission of 1858 that the original work was too elaborate, and it recommended some economies which of course the Treasury jumped at, consequently the rest of the country has been deprived of the only map which gives an ample delineation of the forms of ground. For nearly all scientific purposes, but especially geological and engineering, maps on this scale are essential (where the 1:2500 scale is published there is little other use for them), in fact, it was from the representation of geologists and engineers that the publication was continued. Being a map intended for the use of particular classes, it ought, as far as possible, to meet the requirements of those classes, which in its present form it does not. The adoption of the photographic method of reduction and printing necessitated the publication in quarter sheets, which can never have the exquisite finish of the old sheets of Lancashire and Yorkshire; but, however much the absence of artistic merit may be regretted, a process which ensured more rapid publication would have been welcomed had it not been accompanied by an advance in price equal to 60 per cent. Before the introduction of the photo-zincographic method of printing, the introduction of photographs for the reduction of the cadastral maps is said to have effected a saving of 35,000*l.* on the survey. The users of the six-inch map can fairly claim that, as they have to pay so much more for an inferior map, the least that could be done for them is to spend the money saved at their expense in completing the contouring at 25-feet intervals throughout the country.

One of the most irritating defects of the large scale maps is the partly blank sheet. In the case of the more recent issues this defect has been remedied by transferring a portion of the contiguous county map, but when the two surveys are of very different dates and style this can hardly be successful; but still it is better than the expensive patchwork arrangement which is required to make a map of a river basin, when the river and tributaries are county boundaries, as, for example, the Mersey. To complete one Cheshire sheet, No. 20, of the valley of the Goyt, no less than six quarter sheets of the Derbyshire county map are required. The six-inch, when up to date, affords a handy town map, but where the sheet lines happen to cross a town the number of sheets required (which may be many as four, costing 4*s.*) gives the Ordnance map no chance in connection with inferior but very much cheaper reproductions. If the maps for which the nation has paid so large a sum are to be freely circulated, the Department must learn to cater for public requriements. If private individuals find a remunerative sale for cheap productions of the Survey, the Department must compete with them, not necessarily as to price, but the price and quality combined must be such as will, in the case of an educated purchaser, turn the scale in favour of the Ordnance map. There is no reason why special sheets of all considerable towns and environs should not be prepared by transfers on the six-inch and one-inch scales. There is amongst the

miscellaneous maps of the Survey one of the environs of Glasgow, on the one-inch scale, prepared in this way (price 2s.), which, if printed in colours, hill-shaded, and folded into a cardboard cover, would answer the purpose.

It cannot be denied that most of the Ordnance maps are very expensive. Sir Charles Wilson says that the selling prices per square inch of the Ordnance Survey maps are cheaper than those of foreign countries, excepting France and Italy. This, however, is hardly the point. The Survey costs, roughly speaking, a quarter of a million per annum, and the value of the maps sold annually is about 13,000*l*. Clearly, the price of the maps is a matter of very little importance for the amount yielded, but it is of the greatest importance if the maps are to be made available for general use. The basis upon which the prices of the different maps are fixed does not seem a very rational one. It lies in a very refined distinction between the cost of production and the cost of publication. The cost of production is supposed to end with the engraved copper plate in one case and with the photographic negative in the other. The subsequent processes of printing, preparing new editions, cost of storage, &c., are called expenses of publication. These being heavier in the photographic process the price of the maps produced by this method is greater. Thus, whilst the total cost of map-making has been largely reduced by the introduction of photozincography, the nation getting more work for the same money, the selling price of the maps has been raised 60 per cent. A system which can produce such an absurd result as this is surely in need of reform.

So far as the great cadastral map is concerned, there is no ground for complaint; it fully answers all that is required in a work of that class, and is one of which the department may feel justly proud. But the very best work in maps becomes of very little value if not kept up to date. It is quite time that a permanent revision department was instituted on a liberal basis if the great work which has been accomplished is to retain its value. Already large portions of it are disgracefully obsolete, and consequently the smaller scales reproduced from it. The new one-inch lags so far behind that it is often obsolete before publication. Does any other nation in the world exhibit such a spectacle as a Government cartographical institution engaged in the production of obsolete maps? Again and again has this, the necessity of revision, been pointed out. Every Director-General has pressed the matter on the attention of the Government; it is dwelt on in every annual report. In 1882 the Treasury "recognised the necessity of a revision of the survey, which should be constantly in progress at such a rate as would complete the whole in every fifteen years at least"; but it was not until December, 1886, that they decided to commence, adding the following extraordinary memorandum: "It is to be clearly understood that in agreeing to the commencement of the revision they do not bind themselves to any fixed term for its completion, or to the annual provision of any fixed sum for carrying it out." This is the sort of thing which is absolutely fatal to the proper conduct of a department like the Ordnance Survey. It is a repetition of the indecision and blundering which have cost the country so much in the past, and to which most of the deficiencies of the Survey are attributable.

It would be a good plan for the information of the map users if this Treasury memorandum were printed in red on the margin of every sheet which has not been revised for more than fifteen years.

The cadastral map and the town plans can never be expected to have anything but a limited sale, but they might be much more largely utilised if the arrangements for sale and distribution were put upon a reasonable basis, and measures taken to let the inhabitants of various localities know something of the state of publication in their own districts. If the six-inch and one-inch maps were better known it would probably lead to an increased sale of the larger maps. There is

another and important step to be taken for the utilisation of cadastral surveys which is pointed out by Sir Charles Wilson in his last report, namely, the compulsory use of the Ordnance Survey as the basis of valuation for local and imperial taxes and transactions affecting land.

Since Mr. Galton referred to the inaccessibility of the maps an even worse arrangement than that in vogue at the time has been devised for the sale of the maps. In 1882 the Office of Works closed the London depot, and, notwithstanding the opposition of Colonel Stotherd, then Director-General of the Survey, abolished the agencies throughout the kingdom, handing over the business of the sale of maps to Her Majesty's Stationery Office. The transfer was made on the ground that an undivided responsibility and control would be secured, and from the intimate relations of the Stationery Office with publishers, the sales would be increased. The Stationery Office, however, apparently had no intention of taking the responsibility, for they straightway appointed Mr. Stanford sole agent for England, at 33⅓ per cent. commission, the Government to pay the cost of carriage from Southampton. In 1886 tenders were asked for a contract as sole agent for ten years on these terms. Mr. Stanford's offer of 600*l.* per annum for the English agency was accepted.

Other arrangements were entered into for sole agencies in Edinburgh and Dublin.

General Sir Henry James recommended that postmasters throughout the country should be agents, a proposal which was also advocated by Mr. Galton, but the Treasury refused to appoint postmasters. Of course no new arrangement for the sale of maps can now be entered into until the expiration of the contracts.

One of the effects of the agency monopoly is that the local retailers of the maps seldom know much about the survey, except in cases where they were formerly agents under the old system, and it is only in the larger towns that they keep any stock. In the country it is a matter of extreme difficulty to obtain information. If a resident in Carnarvonshire or Anglesea, for example, wanted a six-inch map of his neighbourhood, and were successful in obtaining it in ten days' time, he would have shown himself to be a man of energy and resource. For the absence of an intelligible guide to its publication the department presumedly is responsible. The official catalogue is a bewildering maze. The index maps, excepting that to the one-inch, with which it is furnished, are beneath contempt. In addition to the catalogue, there is published a series of Chinese puzzles, at 2*d.* each, called county indices. They profess to show the sheet-lines and reference numbers of the 25-inch, six-inch, and the new series one-inch scale maps, but without the assistance of a skilled interpreter are useless. Those of the counties just mentioned are fair specimens. If a would-be purchaser of some of these has finally hazarded a guess at the number of the sheets he requires, there is nothing to indicate whether they are published or not. If he requires a one-inch map, he will, sooner or later, discover that he must get another index, the sheet-lines shown on the county index referring to a map which does not exist, and which may not be published for many years to come.

Something might be done if public institutions such as the central free libraries in our great towns were supplied with copies of the Ordnance Survey publications of the locality, and full explanatory particulars of their objects, purposes, and the means by which copies could be obtained.

Certainly it is high time that steps were taken to remove the obstacles which interfere with the full utilisation of the Ordnance Survey. The establishment of a revision department on an adequate footing is of first importance. This can only be done by increasing the proportion of the annual grant devoted to the revision to a sum sufficient to clear off all arrears. As the cadastral survey is now nearly complete, the expenditure under that head will rapidly diminish, so that if the total

vote for the survey is maintained at its present level for a few years, the arrears of revision might be overtaken without addition to the present annual cost of the survey to the nation. That this will not be done unless very strong representations are made to the Government is evident from the amount of the grants of the four years since an allowance was first made for the revision and from the remarkable Treasury minute quoted above. By a thorough revision most of the defects in the maps pointed out above might be remedied, and a great national work saved from ruin for want of the proverbial ha'porth of tar.

Year.	Total Vote for Survey.	Under head of Cadastral Survey.	Under head of Revision.	Cadastral Survey and Revision together.
	£	£	£	£
1886–7	258,000	189,951	5,000	194,951
1887–8	230,000	149,079	15,000	164,579
1888–9	223,000	93,164	64,000*	157,164
1889–90	215,000	——	——	——

Mr. Crook then read the following letter on the subject of his paper, which he had received from Sir Charles Wilson, Director-General of the Ordnance Survey :—

2nd Sept., 1890.

Dear Mr. Crook,—All Government Departments are the better for criticism, especially when it comes from such a well-informed critic as yourself. The Ordnance Survey Department cannot, however, be held responsible for the obsolete character of many of the maps, or for the system under which Ordnance Survey maps are now sold to the public.

No one can be more sensible than the Director of the Survey of the pressing need for a revision of the maps, but the question is really one of money, which it is for Parliament and not for the Department to decide. I think you have underestimated the pressure which has from time to time been brought to bear upon the Government to complete the 25-inch survey of Great Britain, and, however much we may regret it, we can scarcely be surprised that the survey was pushed forward at the expense of revision. The result is that in many places revision must now be virtually a re-survey.

The present system under which Ordnance Survey maps are sold by sole agents for England and Wales, Scotland, and Ireland respectively, was adopted, as you remark, contrary to the advice of the Director of the Survey. Mr. Chaplin, however, under whom the Survey now is, stated in reply to Mr. Webb last Session, that "when a favourable opportunity occurred a change in the system would be carefully considered." I believe that under a proper system the sale of the maps would be enormously increased, and exceed the sum mentioned by Sir Henry James.

I must point out one or two errors in your generally accurate paper. The six-inch map of the kingdom was completed in March last; that of Ireland has long been completed, and officially recognised as the basis for all dealings in land, and for valuation for local assessment. About one-half of the six-inch map of Ireland has been revised to date on that scale. Until recent legislation with regard to land in Ireland, the six-inch map was considered large enough for all practical purposes

* The actual amount set apart for revision is nothing like so large as here shown, the survey of Lancashire and Yorkshire on the 1 : 2500 scale having been charged to the revision account.

by those who used it, and the necessity for a 25-inch survey has only been felt during the last few years.

I do not know what you mean by a "so-called new survey" of the Northern Counties. There is a "new series" one-inch map, so called to distinguish it from the old one-inch map, which was not based on a large-scale survey as the new one is.

The complexity in the one-inch map of which you complain is a matter of opinion. No country has such an enormous amount of what may be called artificial detail, buildings, roads, railroads, enclosures, &c., as England, and it is a question of taste how much of this should be shown on the one-inch scale. We have more complaints of omissions than of want of clearness; it is impossible to please every one, and the boundaries to which you personally object are the very things which most people insist should appear on the map. They are undoubtedly found very useful, but I agree with you that they do not improve the appearance of the map as a work of art.

With regard to price; if the one-inch sheets were printed on an inferior paper from a transfer to zinc, as is done in France and Italy, they could be sold at 6*d*. each.

You are right as to the one-inch hill sheets of the Lake District. The originals were beautiful specimens of engraving, and there was a great demand for impressions. Unfortunately the plates were worn before the present mode of preparing matrices and duplicates was perfected, and all that could be done was to arrest the disease. The plates will eventually have to be re-engraved, but this cannot be taken in hand until the new map of the south of England has been engraved. The slow progress of the new hill map is due to the difficulty of obtaining qualified engravers, and of training young men to this artistic work.

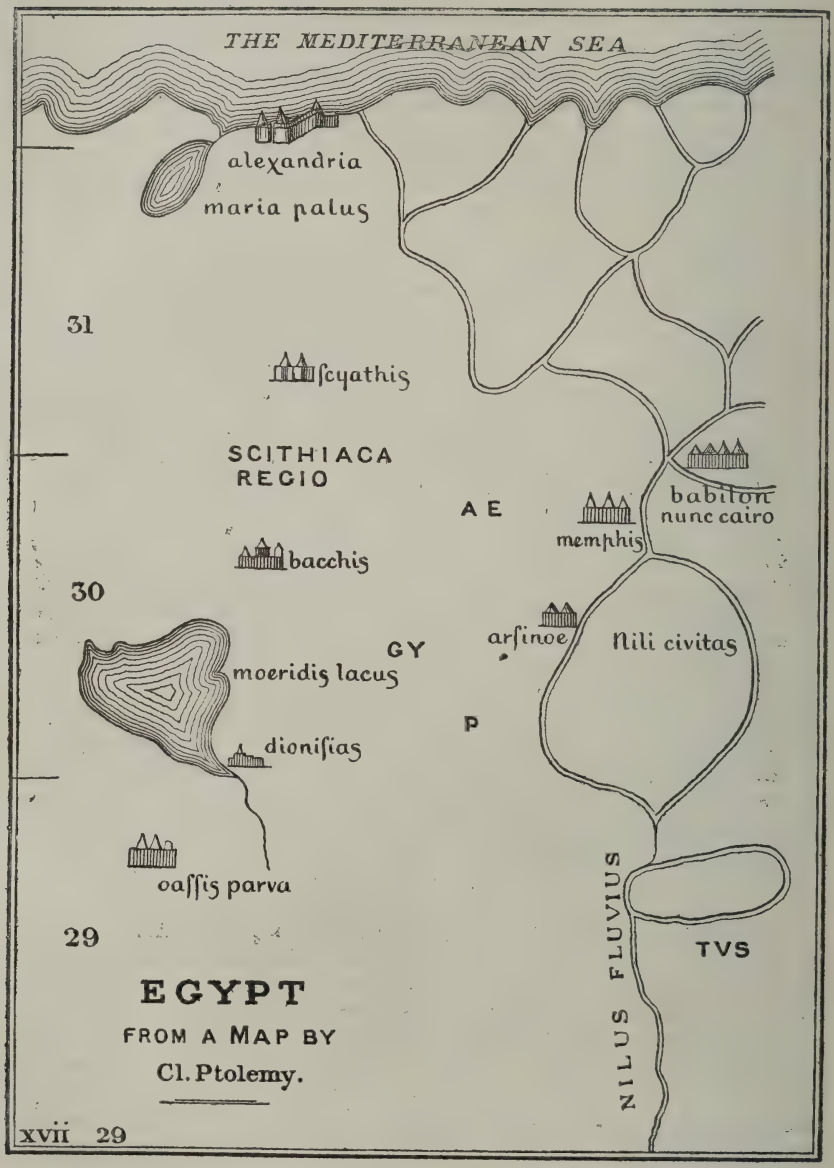
I gather from your paper that one of the faults you find with the Department is that it does not construct maps for popular requirements, such as a combination of sheets, so as to give large towns, like Leeds, with their environs on a single sheet. I think that in this you are rather ignoring the principle upon which, whether rightly or wrongly, the Ordnance Survey has always been conducted. The department is directed to make maps on certain scales, which were settled after many years of controversy, for State purposes. The construction of special maps for popular use was designedly left to private enterprise, and any attempt to compete with private firms in "catering for the public" has been discouraged. I may remind you that the Guide Book maps to which you allude are all based on the Ordnance Survey, and could not have been produced and sold at such slight cost without it. The public thus, and in many other ways, indirectly derive benefit from the great national survey.—Yours truly, C. W. Wilson.

In the discussion which followed,

Sir Douglas Galton said that it would be well if the British Association could be induced to address the Government on the subject, in order that the whole question of the position of the survey and the scale of the maps might be thoroughly agitated and discussed, especially now that the direction of the survey has been transferred from the Office of Works to the Board of Agriculture, where, no doubt, Mr. Chaplin would be most anxious to do everything he could to promote the interests of those who wanted good maps. The farmer was especially interested in the publication of good maps. He therefore urged the section strongly to pass some resolution on the subject. Perhaps the council might be requested to consider the question during the recess.

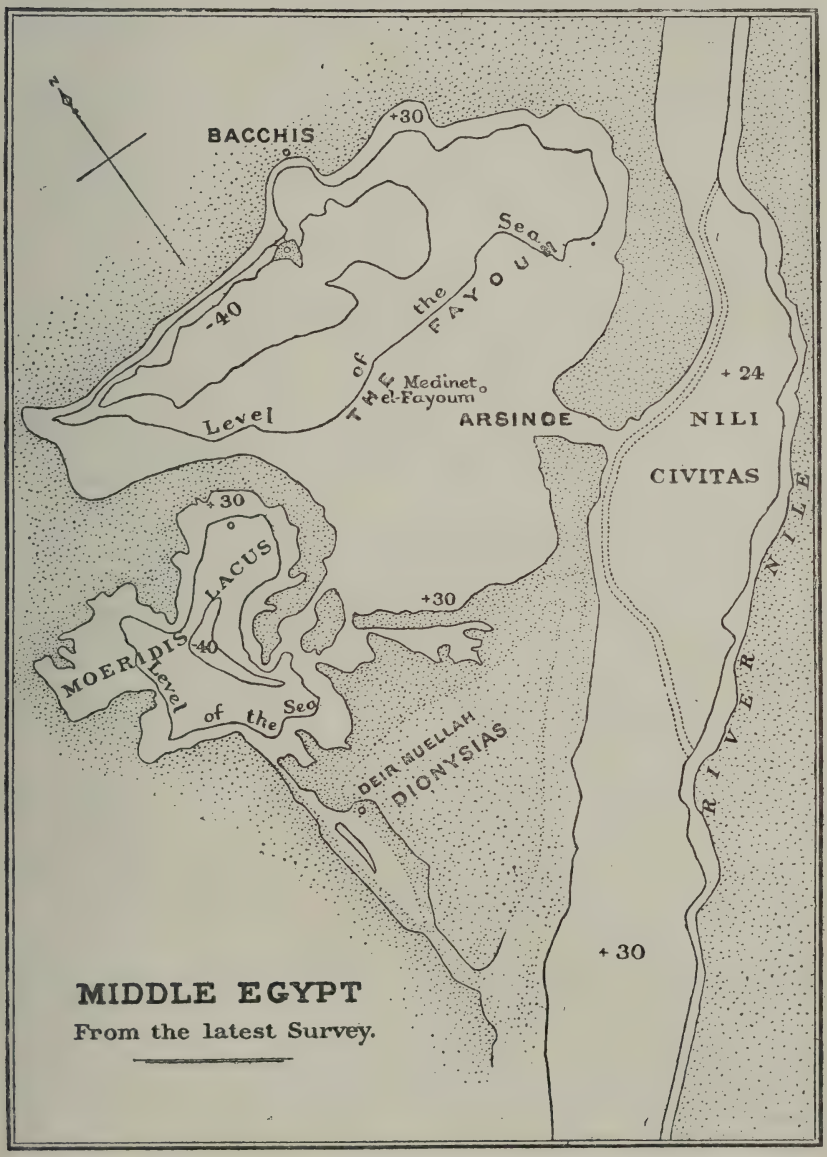
On the motion of Sir Douglas Galton, seconded by Professor Simons, it was resolved that the council should be requested to consider the matter in the recess, and that strong representations should be made to the Government on the subject.

Ptolemaic Maps, with especial reference to Lake Mœris. By Cope Whitehouse.—Prior to 1881 no scholars cited Ptolemaic maps as containing trustworthy information other than that contained in the text. The maps were treated as the plotting by mediæval draughtsmen of the places mentioned by the Alexandrian



geographer, on continents and seas whose general shape was that current in their own time. This practice has continued, and a map of "Cl. Ptolemy" thus evolved by a German cartographer was substituted for the original at the Manchester

meeting of the British Association. It is, however, evident that if it could be shown in a single case that a map depicted facts which are not contained in the text, and could not have been ascertained by the study of other ancient authors, and were also unknown to the draughtsmen of the charts, portolans, or maps of the middle



ages, this would be sufficient to prove that some graphic representation accompanied the written text from an earlier period than the revival of learning.

Such a convenient test is furnished by the "*Mœridis Lacus*," in its shape and

other circumstantial features, as found in the maps of Egypt. The oldest manuscript of Ptolemy—that of Mount Athos—is probably of the twelfth century. It does not represent the natural features of Egypt except in the simplest way, and no attempt is made to give to bodies of water other than the Nile any definite form. The printed editions of Berlinghieri, A.D. 1478; Rome, A.D. 1490; and the so-called "Agnese" (Palmese), A.D. 1554, represent families of manuscripts, of which a very large number have been examined by me. These printed maps are more accessible, and therefore more conveniently cited. The fac-simile atlas of Baron Nordenskiöld (1890) has reproduced two of them. The "Agnese" has been photographed by Orgagnia.

In the protracted discussion in regard to Lake Mœris, on which depended not only the credibility of Herodotus, Strabo, Diodorus, and Pliny, but the scientific reputation of the whole ancient world of letters, the Ptolemaic maps were excluded. Thus Jomard referred to "la *position* géographique du lac de Mœris fixée par Ptolémée à la hauteur de 29° 20′." But in discussing its *form* he confined himself to the text of the classical authors. Their statements clearly indicated an enormous sheet of water filling a large part of the Fayoum, and connected with the Nile valley by the defile between Howara and el-Lahûn. Thus Ortelius draughted it in 1595, and Jomard was positive that the Birket el-Qerûn, extended in area by an increased depth, corresponded sufficiently to the description of the Greek travellers. D'Anville had arrived at a different conclusion, and Lepsius corroborated the well-known and, prior to my researches, universally accepted theory of M. Linant de Bellefonds. They all agreed in certain particulars, and disregarded or rejected the maps.

The map of Berlinghieri simply encloses by a conventional sign an area represented as water by parallel dashes. The Roman Ptolemy depicts a lake, differing in form from every other body of water in Egypt or elsewhere, and utterly at variance with the plain statements of Herodotus and Strabo as graphically reproduced by every cartographer of modern times. The "Agnese," xvii. 29, is on a larger scale, and with an obviously greater attention to physical features. These maps furnish us with a large number of points both negative and positive.

(*a*) The Lake of Mœris is not (1) near the Nile, (2) communicating with it (3) near the mountain above Memphis; (4) has no island; (5) and neither Bacchis nor Arsinoe is on its shores or near them.

(*b*) It is (1) south of the Fayoum, (2) of a most extraordinary shape (somewhat resembling a clover leaf and stem), (3) with a town, Dionysias, on the lake, (4) at the north-east end (5) of a long narrow valley (6) losing itself in the Libyan hills.

A comparison with the map of Middle Egypt, as revised by the War Office (1890), or any of those which have been published as the result of the minute surveys undertaken by the Egyptian Government with a view to the conversion of this area into an impounding reservoir for the Nile flood, shows that the Wadi Raiyân, if filled to the level of high-Nile, and at no other level, has the shape and position of this lake as represented on the best Ptolemaic maps. At the Deir-Muellah are capitals of columns and other indications of its existence in the 2nd century A.D. The map, therefore, represents Egypt after cultivation in the Fayoum (or Arsinoite Nome) had displaced the large body of water seen by Strabo and Diodorus, but before the decay of those vast irrigation works which elicited the admiration and astonishment of the ancient world.

The embankments and canals which kept this depression in communication with the Nile probably perished in the third century A.D. The Bahr Jûsuf and the dam of the Fayoum required but slight annual repairs. The benefits received and the dangers averted immediately affected those who lived upon the canal and its

branches. Mœris, however, existed chiefly for remote provinces. It therefore required for its maintenance a strong central government, with sufficient administrative skill and energy to take precautionary measures, and expend 10,000*l.* annually in opening and closing the canal (Diodorus). This was done largely in behalf of towns and fields, threatened by the Mediterranean, an excessive inundation or drought, in provinces 200 miles distant. Alexandria, Pelusium, and Heroum Oppidum suffered, as the three ports of Egypt on the Mediterranean and Red Sea suffer to-day, when an excessive share of the insufficient summer-supply is served to those who are nearer to the apex of the Delta. As with Roman roads in Britain or aqueducts in Southern Gaul, such a public work could not survive a serious shock to the administrative system. There were local interests which were at once preferred to the public weal. Profiting by intestine disorder and foreign invasion, the Nile resumed its ancient freedom and thrust aside the restraints by which it had been controlled for 2000 years. It swept over and obliterated the canals by which "Sesostris had changed the face of the Delta" (Herodotus). As the inundation subsided, its ancient ally, the Mediterranean, penetrated into the heart of Lower Egypt. The king's object "to supply Nile water to the inhabitants of the towns situated in the mid-country and not lying upon the river" was defeated (*ib.*). As at present, the inhabitants of villages 70 miles from the sea were "obliged after the subsidence of the flood to drink a brackish water which they obtained from wells" (*ib.*, chap. 108). Deprived of this essential to existence, the population abandoned the struggle and quitted the once-fertile and populous areas now known as the marshes or lakes of Bourlos and Menzaleh, and the adjacent plains ruined by saline efflorescence.

The "Moeridis Lacus" of Ptolemy, therefore, is the southern basin only of the extraordinary depression, whose changes of water and land have been repeated and various since Joseph first converted the deep lake of el-Hun, or Phiom, into the fertile province of the West (Arabian tradition *passim*). Although limited in area to 250 square miles, it would naturally retain the name of the larger sheet. It was still the "Lake of Lakes" in size and importance. "There is no doubt," said Col. Ardagh, "that the Raiyān basin is capable of being turned into a storage reservoir fulfilling all the purposes of the ancient Lake Mœris." In matters of evidence, as in mathematics, the chance of accidental coincidence diminishes with great rapidity as the lines are multiplied. Three are sufficient to establish a point in space. If the number and character of the converging lines here enumerated be fairly considered, it must be admitted that we have in the Ptolemaic atlas fair copies of maps sold in Alexandria in the 2nd century A.D.; and that they are, so far as genuineness is concerned, good evidence to the natural features which they depict.

Ptolemy's Topography of Eastern Equatorial Africa. By Dr. Schlichter.—Will be published in a subsequent number of the 'Proceedings.'

The Actual State of the Question of the Initial Meridian for the Universal Hour. By the Rev. C. Tondini de Quarenghi.

On Recent Exploration in New Guinea. By Coutts Trotter.—A paper on the results of recent exploration in New Guinea up to 1885 having been read before this branch of the Association by the present writer five years ago, it has been suggested that a résumé of the work done since that date may be not unacceptable to the section.

The most striking, if not the most important, piece of exploration done within this period is the ascent, by Sir William Macgregor, of Mount Owen Stanley, the lofty peak which has so long stood forth as a challenge to explorers, additional interest being given to the journey by the fact that his route lay through a new country, that is, up

the course of the Vanapa river, which rises in the range itself, and takes a direct course to the sea at Redscar Bay. Previous exploration towards the main range had hitherto always gone up through the difficult broken country at the back of Port Moresby, much of which has already been surveyed by Mr. H. O. Forbes, whose valuable work in that district is well known to geographers. With slenderer resources Mr. Forbes had, in fact, ascended from Port Moresby, and, following partly the valley of the Goldie river, attempted the ascent from the south-east, and had arrived within eight or nine miles of the summit, which rose before him apparently within a fair day's climb at the opposite side of the Warumi Valley, when he was forced to return by the desertion of his native followers, who were filled with superstitious terror at the proposal to ascend the lofty mountain. This is not an uncommon dread among the Melanesians, and yet, curiously enough, no such feeling seems to have existed among the natives encountered by Sir W. Macgregor, approaching from the westward—if, indeed, he rightly understood their remarks on the subject.

After passing through the alluvial belt on the coast, the country at 12 to 15 miles from the mouth of the Vanapa becomes very broken, low forest-covered hills of clay and slate occur, the river is rapid, with snags, and boulders of conglomerate and basalt; further inland the schistose rocks are highly metamorphosed, passing in the higher ranges into very micaceous schists, highly crystalline on Mount Victoria, and approaching to gneiss, with intersecting veins of quartz. Four successive ranges were crossed, rising from 2600 to over 11,000 feet, till at length, by turning the head waters of the Vanapa, at about 10,000 feet, the Owen Stanley range itself, lying north-west and south-east, was reached; and the party following the ridge for about 20 miles arrived at its culminating point, which is at the south-east end.

Between 6000 and 8000 feet they passed through a region of dense fog and mist, where the silence was unbroken even by the voice of a bird; the trees were draped with moss, and everything was saturated with moisture, the travellers for a considerable distance dragging themselves, or climbing along through the roots and branches and gnarled trunks without touching the ground, as in a mangrove swamp. Above 8500 feet an undergrowth of bamboo begins, and the mists are replaced by a fine dry climate. The bamboos continue up to 11,000 feet, easy at first to cut through, but growing stronger higher up, and covering even the large trees, making travelling very difficult. Arboreal vegetation ceases at about this height, the shrubs continuing for another 1000 feet, while the genuine Alpine flora begins at about 10,500 feet, about one-fourth being of Himalayan type, among them several ericaceous (including vacciniaceous) plants—so rare in Australia, and a few British plants not cosmopolitan; but there is a marked preponderance of New Zealand and sub-Antarctic forms, and some plants only hitherto found on Mount Kinibalu, in Borneo. Strawberries were found on the highest ridge, and were very welcome, the commissariat being, perhaps, the principal difficulty of the journey. Fortunately the few natives met with were very friendly, and ready to supply food; but for this the expedition must have failed. No native gardens were seen at above 5000 feet. Of birds, two new species of bower-bird were found, the differentiating characters lying rather in the mode of construction of the bower than in the birds themselves; also a todopsis, and a blackbird, but no change towards types of cold or temperate regions corresponding to the change in climate and altitude.

The highest crest of the Owen Stanley range, which Sir W. Macgregor has named Mount Victoria, runs north-west and south-east, and appears to be over a mile in length, and to consist of six peaks, those at either extremity being a few feet higher than those between. Great precipitous buttresses bristling with peaks are thrown out from either flank of the range at about 12,000 feet. Sir W. Macgregor estimates the highest point of the crest approximately at 13,121 feet; the old

Admiralty Survey gives the height at 13,205. From the summit a great detached mountain, estimated at 12,750 feet, is visible to the north, about 30 miles distant, and two more to the north-east, and at a much greater distance others, which seem to be the peaks of the D'Entrecasteaux Islands off the north coast. The country towards the north coast is pronounced to be very much less mountainous and more thickly peopled than that towards the south; but detailed speculations on these subjects seem hazardous, for Sir William had just sketched three large lakes into his note-book, when, by the accident of a native setting fire to one of them, he discovered they were merely grass clearings. To the south-east a broken mountain tract of much lower elevation seemed to separate the Owen Stanley from the Mount Obree range, the further end of which, some 60 miles from Mount Victoria, has been visited from the south, and described by Mr. Cuthbertson.

The natives of the Owen Stanley district, though very friendly and fairly trustworthy, were timid and suspicious, and effectually scared by any attempt at sketching, even the landscape. They are somewhat shorter and more muscular than the coast men, frequently with broad, prominent cheek-bones and Semitic noses, the nostrils less arched than in the ordinary Papuan type, and the chin and lower jaw stronger. The old men wear elaborate caps of cuscus skin ornamented with cassowary feathers, dogs' teeth and boars' tusks, all this corresponding closely with what Mr. Forbes saw of the people to the south-east.

A fine suspension bridge, a remarkable work for so primitive a people, crosses the Vanapa lower down. It is 70 yards in length, constructed entirely of rattan, skilfully and securely fastened at the ends, the footway consisting of four rows of these canes, while there are two rows of rails on either side, a cross section of the bridge thus having the form of a somewhat rounded V. The lower course of the Vanapa is well suited to bring down the valuable timber which grows on the neighbouring ranges.

Mount Obree.—Mr. Cuthbertson's expedition to Mount Obree, above referred to, started for Kappa Kappa, 30 miles south from Port Moresby, and passed for some 20 miles through an undulating grass country with occasional jungle, chiefly along the river banks, with numerous villages and gardens, the sugar-canes, wild and cultivated, being specially abundant. After striking the Kemp Welsh river the country rises gradually, ridge after ridge, the grass on the mountain sides being generally replaced by thick jungle, towards Mount Obree, which is about 45 miles in a straight line from the coast. Here Mr. Cuthbertson encountered, though in a modified degree, the usual superstitious fears about a high mountain. The people believed it to be inhabited by the spirits of their dead and other evil beings, still they promised to accompany Mr. Cuthbertson, only stipulating that he should not offend these powers by cutting trees, breaking stones, &c. Their fears, however, at last overcame them, though it was mainly a physical dread of the steepness of the mountain sides, which they feared would fall on them. At 7500 feet Mr. Cuthbertson encountered a stratum of the dense fog which was found on the Owen Stanley range at the same height. From the highest point reached he saw the peak of Owen Stanley bearing 317°, his own altitude being 8000 feet. No higher peaks were visible, but, as the Admiralty Survey records a height of 10,246, it seems probable, without impugning the measurements of this very capable explorer, that some higher peaks may have been obscured, either by the forest which extends to the summit, or by the prevailing mist.

An interesting feature of this expedition was the assemblage and friendly association, in Mr. Cuthbertson's service, of a large number (some 200), of people belonging to different tribes, hitherto unacquainted with each other, and therefore presumably enemies.

No mere résumé, however, can give any idea of the difficulties of the explorer in

managing such a party of native carriers, on whom the success or existence even of the party mainly depends. He mentions a curious instance of superstition: a kangaroo having been caught by his dog, the people were afraid to eat it, because it was taken on hostile soil.

The Fly River.—The ascent by Sir W. Macgregor of the Fly river, which is by far the largest in the Possession, to a distance of over 600 miles from its mouth, and the discovery and ascent to about the same distance and latitude (about 5° 31′ S.) of its eastern affluent, the Strickland, by Captain Everill, add somewhat to our knowledge of the interior; but the country traversed, a vast level, and at times partly submerged alluvial tract, probably extending to a great distance both to the east and west, offers but little interest in proportion to its extent.

The Strickland is the broader, but shallower and more rapid stream of the two. It enters the Fly at 240 miles from its mouth, and at their furthest points the two explorers seem to have been within 40 miles of each other, and the country and distant ranges seen and described by Sir W. Macgregor from his furthest point seem to have had the same appearance for Captain Everill.

The tide ascends the Fly 150 miles, and coco palms were found at 414 miles from the sea.

For nearly 400 miles the windings are great, and the intervals probably at times under water. Only occasional low elevations occur on which villages are built. After 400 miles the banks are higher and better defined, with real grass on them, but even here the land slopes away back into swamps. It is therefore a country unfit for permanent occupation, the forest supplying little or no natural food but some occasional sago and inferior bread-fruit. At 486 miles the first stones occur, as pebbles in the stream, volcanic, granitic, or slate with quartz veins. The lower hills now entered are tertiary and cretaceous, the distant mountains, which, judging from the pebbles, belong to primary formations, and probably contain metalliferous deposits, lie apparently within German territory.

From his furthest point Sir W. Macgregor saw in front of him, about 10 miles off, and probably in British territory, a range some 1500–2000 feet high, and 20–25 miles in length, beyond which, at about 40 miles, was the Victoria Emmanuel range of D'Albertis, apparently some 12,000 feet high. Between the two, and beyond the north-east end of the former range, is another very steep range, running south-east and north-west, perhaps 50 miles in length, and 5000 to 6000 feet high. As its highest point seemed to be in German territory, Sir W. Macgregor gave it the name of Blücher.

A good deal of this upper country is available for continuous cultivation; the traces of population are numerous, and, so far as could be known, they are peaceable, for the party was a good deal separated and no attempt was made to molest them.

Tobacco with a very small leaf was found cultivated here, yet its use was unknown to the natives in the previous 180 miles. But probably the tribes are not only isolated, but, unless in these upper regions, to a great extent migratory. There is a settled population only for the first 50 or 60 miles of the river, wherever any land is available, and again at one or two points higher up. Speaking generally, the commercial possibilities of the region seem small; there is a certain amount of cedar and other useful timber, but this is limited by the swampy character of the soil.

Kiwai Island.—Certain places in the estuary of the river, however, offer more points of interest. The island of Kiwai, a great deltaic segment at the mouth of the estuary, 36 miles in length, and with an area of 60 square miles, holds out a prospect of greater commercial importance, both from its geographical position, and from the exceptionally prosperous condition of its numerous population. It is nowhere more than six feet above high water level, and a good deal of its area is below the level of

spring tides, but the people are assiduous and careful cultivators, and there is a great variety of vegetable produce. The most important articles of food are the coco-nut and sago, the latter being always in use, whatever other vegetables may be available in addition, and next to these the banana. No less than 36 varieties of banana, we are told, were observed; 20 kinds of yams, 10 of sweet potatoes, and 11 different kinds of fibre. The mango, taro, sugar-cane, and melons were found, but no member of the orange family. Mr. Bevan, who had visited the island, asserts that the people are cannibals, and describes their orgies; but his narrative was put to a severe test, for it was translated and read to the supposed cannibals, and was received by some with shouts of laughter, while others profess themselves greatly scandalised! Sir William himself seems to think it a calumny.

Their houses are elaborately constructed, and are described as models of cleanliness, order and regularity.

The mainland just beyond Kiwai seems to be hardly anywhere above, and much of it below high-water level, and mostly covered with forest and impenetrable interlacing scrub. It is conceivable that such land might be utilised by a people accustomed to rice culture, but besides the enormous cost of clearing, the new comers would have to reckon with a numerous and warlike people, who already occupy all the localities now available for cultivation.

In his dealings with the natives on this voyage, Sir W. Macgregor displayed a tact and forbearance which had the happiest results. On the few occasions when hostilities were threatened, actual fighting was avoided. Every opportunity was taken by Sir William to deposit little presents in canoes, or other places where they would be found, and nothing was taken away. The consequence was that on the return journey they were hailed as friends, even by those who had threatened mischief before. This is the more remarkable when we recollect what has happened here in former years, and many of the natives, before they could be persuaded to hold any intercourse, enquired nervously whether there would be "pu," which expressed their reminiscences of a gun-shot!

They were keen traders, and yet nothing would induce them to part with some of their personal ornaments, whether because they represent a great deal of labour, or because they are family heirlooms, who can say? At all events one can understand their resentment at the loss of such articles when thoughtlessly carried off as curios by previous explorers.

Aird River, &c.—The Aird river and other streams at the head of the Papuan Gulf seem to give more ready access to a fine valuable country than any other road yet discovered.

The region, so far as yet explored, is at least 100 miles in width, and probably extends as far westwards as the Fly river. For some 30 miles from the sea it is alluvial and more or less swampy, but rises thence into an undulating well-wooded hill country. Throughout its known extent, besides the great rivers that come down from the interior, there are intersecting channels communicating with these and forming a valuable inland waterway from one end of the district to the other. Mr. Theodore Bevan ascended the Aird river (so named by Captain Blackwood in 1848, and which Mr. Bevan has unnecessarily renamed the Douglas, and higher up the Philp), and found himself, at about 45 miles from the coast, in a beautiful country with steep wooded hills, 300 to 2000 feet high, of cretaceous limestone, and higher up of basalt. The avifauna and flora are rich and beautiful; among the valuable plants seen was the massoi, whose bark is in so great demand in China and elsewhere. Water-worn pebbles of metamorphic rocks and diorite, and magnetic iron sand, which yielded colours of gold, seem to indicate the presence of primary rocks in the ranges higher up.

To the north Mr. Bevan asserts that he saw the distant peaks of the Bismarck and Finisterre Mountains. Another great stream, 60 to 80 miles east of the Aird river, which he has named the Queen's Jubilee, but which might perhaps be better called by the native name of its eastern channel, the Aivei, was also ascended. At 100 miles up the stream it was still 200 yards wide and very deep, with a rapid current, the undulating country around very fine, the ranges beyond rising tier above tier, the watershed probably lying within the German territory. The great fluctuations of level, common in New Guinea rivers, were indicated by accumulations of drift-wood 20 feet above the then level. Great tracts of country, which were apparently uninhabited when Mr. Bevan first went up, were found afterwards swarming with people, showing probably that in all these deltaic tracts the population is migratory, and (one may add) cautioning us against drawing hasty conclusions about them, even from the most honest and trustworthy reports. The character of the people, too, differed greatly within a very short space. On the lower waters Mr. Bevan found a fine-looking people, tall and muscular, boisterous and fearless, while up stream they were distrustful and timid, frightened by loud shouting—the dislike to loud speaking is a common and curious characteristic of these people—and had to be carefully enticed into intercourse by presents floated down to them in empty bottles. The latter condition is the less wonderful of the two. We can hardly over-rate the courage of a savage who, never having seen any vessel but a canoe, suddenly encounters a puffing steamboat and ventures on board.

And here, although the details of adventures encountered on all these expeditions do not come within the scope of this paper, it is only fair to recall the fact of the arduous labours undergone on each occasion, and the imminent dangers run, as well as the readiness and fertility of resource displayed, without which success would have been impossible.

Mai Kassa River.—Another interesting and characteristic river system, which has been recently explored, is the Mai Kassa, which drains the district lying in the angle formed by the right bank of the Fly and the coast to the westward. At its mouth the Mai Kassa is over a mile wide, and more than 13 fathoms deep in the centre. The banks are low and muddy, and lined with mangroves for 30 miles, where the stream is still 300 yards wide with 6 fathoms of water. Here a somewhat smaller branch, the Wassen Kassa, leaves the main stream to the westward and flows down to the sea, having a similar character throughout. Above the parting of the streams the river runs through undulating open forest country, and at 50 miles from the sea, in lat. 8° 33′ S., is only 10 yards across. The country on either side of the two channels is swampy, with open forest and long grass, and occasional ridges 10 to 20 feet high, formed of good loamy soil and covered with dense jungle. The two streams are connected by more than one channel, thus dividing the delta into islands. It has been hitherto supposed that the rivers had some connection with the Fly, but this last survey seems to show that they form a system of their own. Some interesting facts are learned of a mysterious pirate tribe, the Togari, who ravage the neighbourhood occasionally, coming from the westward every other year, and forming temporary camps. They are described by the natives as varying in colour from black to nearly white, with long curly hair, and wearing short-sleeved shirts made from the pith of a tree. It would seem that their home cannot be far off, for their canoes are very crank and without outriggers, 33 to 38 feet long, 4 feet wide, and 4 feet deep, but their precise habitat has not yet been ascertained, though Sir W. Macgregor encountered several of them, a very fine, light brown people, not far from the Dutch frontier (141° E.).

St. Joseph River.—Another interesting district recently explored lies between Mount Yule and the sea in Hall Sound. It is watered by the St. Joseph river, which

appears to be navigable for 40 miles, having a depth of 12 to 18 feet, though there are only five to six feet on the bar. The country up to the foot of the hills, some 38 miles, is fairly level and accessible to horses, well grassed and watered, and fertile, with some 150–200 square miles of very good country, while the slopes of the lower hills at the foot of the great range are suited for plantations of tea, coffee, cocoa, or vanilla; but this district is thickly peopled, and although a good deal of land is unoccupied, the amount really available for European settlement would be very small. At one time or another it has been all under cultivation, for there is no old forest.

The people, though not unfriendly, have not the savage virtue of hospitality, and indeed throughout New Guinea it is very rare to get even food given without payment, but they are relatively well advanced. There are regular market-places, and intercourse between friendly tribes, and though between the rest there is a regular debtor and creditor blood account, they are above cannibalism, and there is no head-hunting nor trophies of skulls. They dance quietly every night, except after a death, when dancing is stopped for a month. Their houses are clean, and each contains a large bag, into which the whole family retires at night to escape the mosquitoes. The women, though both house and field work is done by them, have a good deal of influence in the management of affairs, and some of the chiefs are very intelligent, though as a rule their want of influence makes it difficult for us to deal with their people. For this end, appeals to the influence of the women were sometimes found more effective. A single language, that of Roro (Yule Island), is spoken over an exceptionally wide area, which marks a relatively advanced condition, and is a great help in administrative matters. The whole district seems to have a future, and is chiefly under the Roman Catholic missionaries of Yule Island.

The different levels of civilisation and intelligence among the different tribes of New Guinea, not necessarily corresponding to any markedly different ethnic characteristics, are remarkable. It has often been observed that the cannibal tribes are by no means the most degraded; on the other hand, there is evidently a stage of progress above which cannibalism is not found.

Our knowledge of the country has been a good deal extended by the expeditions which have been undertaken to arrest criminals in their own villages. Until recently the authorities have been content to avenge an outrage by shelling the village, no other measures being available; and this was, after all, in accordance with the native idea that responsibility in such matters should be rather collective than individual. Latterly, however, it has been carefully impressed on them that our quarrel is only with the actual criminals, and by no means necessarily with the tribe to which they belong, and a very wholesome effect has been produced by the gallant way in which these have been followed up and seized in the midst of their own people. We also incidentally learn much from these expeditions of the conditions of life among the inland tribes. In the forest country about 40 miles south of Port Moresby a small and decreasing tribe, the Veiburi, was being slowly exterminated by a more powerful neighbour, the Manukoro, who, occupying a fertile and beautiful hill-country, and having numerous allies, thought they could defy the Government, and had recently murdered five of the Veiburi people. The chief, however, was given to understand that we only wished to secure the actual perpetrators of the crime, and though thinking the proposal very eccentric, he said he would not oppose it. Accordingly a small party marched up to the headquarters of the tribe, which they found to consist of three strong villages. The murderers, who, far from seeking concealment, were the heroes of the day, were here seized and carried off from among a circle of admiring friends, who were oiling and otherwise honouring them after their exploit.

The condition of the Veiburi is described as pitiable, the entire population,

under constant apprehension of such attacks, living for safety in houses built high up in the trees, one enormous tree containing four large houses of the kind, each with its platform, on which is stored a heap of stones to be used in defence.

The prestige of the Manukoro being thus broken, they submitted readily to the new order of things. This case is by no means a solitary instance of such relations between two tribes: in some cases the oppressed admit their condition to be a part of the settled order of things, while in others it is resented as unjust, and depending only on the *droit du plus fort*; but each alike gratefully accepts the relief brought by the new régime, and it is plain that the establishment of a "Pax Britannica" among people living under these conditions must be indeed an unmixed advantage.

East Cape.—The entire peninsula lying between the head of Milne Bay and the extreme eastern limit of New Guinea at East Cape, a district comprising some 150 square miles, has also been thus visited. A ridge 3000 to 4000 feet high runs through its entire length, with occasionally a level or undulating tract between it and the sea, wider on the north side. The whole region is densely wooded, with a clearing here and there, the soil generally very fertile, large groves of coco-palms occupying the level ground.

The natives, who had at first opposed us bravely in defence of their offending clansmen, at last cordially gave in, apologising for having fought us, on the ground that they had no idea how strong we were. They do not build over the water on piles, but on dry, well-chosen sites. The villages are clean and well laid out, surrounded by trees and ornamental plants; the spaces between the houses are gravelled with basaltic or coralline shingle from the beach. They seem to have the usual Polynesian dislike to grass. So far as we know, there is only one "village green" in the whole territory.

Weather and Climate.—No definite report or suggestion has come from any of these expeditions recommending any special locality as a desirable place of residence for Europeans, or as a sanatorium, such as the high mountains of the interior might be expected to furnish. Before this can be done, however, much more has to be learned of the climatic conditions—e. g. of the times of the principal rainfall in the different districts. All New Guinea is within the latitude of the south-east trade winds, which blow from March or April to October. After this, the sun passing south and heating up the Australian plains, the wind draws round to the north-west, bringing the clouds, which are condensed on the relatively cool mountains and forest-clad surface of New Guinea. But the south-east trades, by the time they reach New Guinea, are also charged with considerable moisture; accordingly, in certain districts where the south-east winds impinge most directly—e. g. about Huon Gulf on the north coast, this, and not the north-west monsoon, constitutes the rainy season, for such districts have high lands behind them which intercept the moisture brought by the north-west winds. As a rule, on the south coast the period of the south-east trade, though the force of the wind often makes it dangerous to navigation, is the dry and healthy season; but there are exceptions, and Mr. Cuthbertson, during his expedition in July and August, met with very heavy rains.

Again, in many districts local accidents interfere and materially alter the normal conditions. On the north coast the rainfall has been noticed to vary much, both as to period and amount, according as the wind strikes the land directly or obliquely, or as the land first reached is high or flat.

On his journey to Mount Owen Stanley, Sir W. Macgregor encountered daily thunderstorms, originating in the high mountains and bringing rain in the afternoon; but these ceased about the 10th of May. There was occasional rain after this, but the mountain itself, reached on the 11th June, appeared as if no rain had fallen on it for weeks.

On the Fly river, in February, it struck Sir W. Macgregor as strange that there was no sign of a rainy season, all the rain which fell being due to the daily afternoon thunderstorms. He remarked that the temperature fell considerably at night —from 85°–90° to 72°–76°, which he suggests may be caused by the north-west wind blowing from the snow-covered mountains in the Dutch territory.

Mr. Bevan again, on the upper branches of the Aird river, in April, had bright weather till noon, when it clouded over, and thunder occurred at night, followed by rain.

The eastern extremity of New Guinea, with its densely timbered high lands, has always a considerable rainfall, while the adjacent islands have a finer and drier climate, with very little malaria. On the main land, the great sanitary difficulty is fever, which is very prevalent, and its conditions still curiously little understood. It may be very troublesome where weather, soil, and other conditions are favourable to health, and perhaps almost absent under the opposite conditions. The duration and severity of the attacks are alike uncertain. *En revanche*, there are very few other ailments, and apart from fever the country might be called healthy. An epidemic resembling influenza, recalling those prevalent in the South Seas, and attributable there to the visits of European ships, occurred lately at Samarai Island. On the German coast an epidemic of dysentery became a *causa belli*. It was induced by a severe drought, but the people believed it to have been caused by sorcery practised by a neighbouring tribe, and they resented this accordingly.

German Territory.—The German territory of New Guinea differs from our own in certain features. Thus in the north-west, towards the Dutch territory, from about 4° N., the high lands fall gradually away into extensive plains. Near Astrolabe Bay also there is a great plain which, though intersected by ranges in the south and north, extends inland for an unknown distance. The rivers are numerous; those from the more mountainous south being comparatively short and rapid. Those in the northern parts have longer courses and great volumes of water, notably the "Empress Augusta," the mouths of which were long ago noticed by Schouten and Lemaire, Tasman and D'Urville.

Augusta River.—It is one of the three great known rivers of New Guinea (the Fly, and the Amberno in Dutch territory, west of the Empress Augusta, being the others). It has no bar nor delta, and is about 1½ miles wide at its mouth, and one mile wide 35 miles higher up, with a current of 3½ miles an hour. It has been ascended for some 370 miles, and for the first hundred would carry large sea-going steamers. The highest point yet reached is 50 miles distant from the Dutch and 55 from the British boundary, in 4° 15′ S. lat., and 141° 50′ E. long. From this point mountains were seen bearing west, and west by north, about 1000 metres in height. For over 200 miles it runs through extensive plains, which, to judge from the flood-marks on the trees, must at times be entirely under water; above this point for about 30 miles it has carved its course through hills of mica schist and gneiss, above which an alluvial region is found again.

The country on the right bank is throughout the higher, and at greater or less distances are observed ranges of hills, from which all the known affluents, four in number, of this great river, are derived, and these appear to lead far up into the elevated country on that side. At certain points the natives were numerous, and the villages exceptionally large, marking a relatively advanced population; the houses along the banks are strongly built and raised on great trunks of trees. On the upper river forests of fine timber alternate with downs, and scrub apparently covering a very fertile soil. These large villages are also found inland from Hazfeldthafen, where they form little confederacies, of which the people speak the same language, and have stated meetings for trading or festive purposes.

The absence of reefs may explain a feature not unfrequent along the northern coasts. The mouth, or mouths of a river become silted up by the action of the waves; the waters being thus dammed up form extensive lagoons abounding in fish, where the semi-amphibious people live over the water in pile-supported villages. The barrier between the lagoon and the sea is overgrown with trees, or planted or cultivated, and the surplus waters find their exit to the sea by oozing through it. Although the interior, except at a very few points, is still unexplored, there appears to be a good deal of land available for cultivation, either on narrow strips between the sea and hills, usually raised beyond the level of the waves, or, where the high lands are further from the sea, the low intervening hills are often suited for plantation; and there are besides considerable deltaic tracts at the mouths of rivers.

The Berlin Company is doing excellent work in experimental planting, and some of the plantations have advanced beyond the experimental stage.

New Britain.—In New Britain (Neu Pommern) there is said, however, to be a much larger proportion of available land in open valleys and well-watered plains—a great river, hardly inferior to the Empress Augusta, has been discovered on the south coast, west from Cape Merkus. On the north coast the large islands of our charts, Willaumez, Raoul, and Dufaure, have been found not to be islands at all, but part of the mainland, though the positions there given to them are correct.

Volcanic action, unknown in New Guinea, though extending parallel to its north coast from its south-east extremity for many hundreds of miles, is very violent in New Britain, and in some of the islands between it and New Guinea. In March, 1888, owing to an outburst in Vulcan island, a wave 40 feet high broke over the opposite coast of New Britain, sweeping away a forest tract 1 kilometre in extent, and covering the land up to the mountains with trees, pumice, and débris. Several members of an exploring party were overwhelmed. The natives, though attributing the catastrophe to the quarrying of stones, which had offended the volcano, gallantly attacked the wave with stones and clubs. The wave is thought to have been produced by the fall into the sea of the upper part of the peak of the volcano.

Condition of the People.—Until more is known as to the condition of the people and their ideas and wants, the question of occupation, or purchase of land on any large scale by Europeans, must remain in abeyance. The general impression gained by the official journeys that have been made, is that there are no large areas of land of any value which are not utilised, more or less, at one season or another, by the natives. At the same time it is pretty clear that with the increase of security, and perhaps by the introduction of new sources of food, the natives might get much more out of the land than they do at present; and there must, in places, be available land fitted for European plantations, the presence of which, under proper control, would have an educating and stimulating effect on the people.

It appears to be difficult to induce the natives to try to cultivate any new source of food supply, but the same difficulty occurred in Fiji, when cassava was introduced, and similar prejudices have not been unknown in Ireland. On the other hand, they are alive to experiment. Mr. Cuthbertson found them collecting and planting his candle-ends, with a view to a future supply. It must be remembered too that there has long been a considerable native trade between districts far removed from each other, not merely as between coast and inland tribes, but along the coasts and islands; from before our arrival cargoes of pottery have yearly been shipped from Port Moresby to the westward, to be exchanged for the sago of those parts, and the canoe-builders of the Woodlark Islands are widely employed by distant neighbours. It may fairly be expected, then, that the creation of new desires and wants will stimulate the people to work for themselves, though it is difficult as yet to guess to what extent they would ever work regularly for others. As to the latter point, the

little experience had goes to show that they are by no means as hopeless as was at first supposed. When employed in collecting copra, gum, and bêche-de-mer, and in wood-cutting, they have been found generally willing, and not unintelligent.

Gold.—The question of minerals, and especially gold, has excited much interest. There seems every reason to believe that the highest mountains in the interior are of the same formation as the gold-bearing strata of New South Wales, but though colours of gold have frequently been found in washing the river gravels in their upper courses, it has not yet been found in any quantity. And although these washings may, and probably do, come from the rocks in the interior, it is also possible that they may, in places, be merely the detritus of conglomerates themselves the remains of strata which no longer exist.

In the Louisiade and neighbouring islands some 800 miners have been at work, but they do not seem to have done much more than pay their way. Their presence in such numbers was naturally a source of anxiety to the Government, but to their great credit their relations with the natives were very satisfactory.

The value of gold reported as sent to Cooktown was about 15,500*l.*, but the amount actually sent may have been considerably more. These are small figures and those of the other chief headings of trade are as yet equally insignificant; pearl-shell representing only 1510*l.*, bêche-de-mer 2178*l.*, and coco-nuts 550*l.* But it should be remembered that the two former items are quoted in the Queensland trade returns at about 100,000*l.*, and a good deal of this may be supposed to come from New Guinea waters.

The copra and coco-nut trade will no doubt also develop in a region so well suited for the growth of these trees, where hurricanes are practically unknown; and the timber trade may also have a future. It has been pointed out that the probable entrepôts of commerce on the south coast of New Guinea are not further from the chief ports of Queensland than some districts in that colony are from others. For trading purposes, then, the position of British New Guinea will not compare unfavourably with that of the more remote provinces of Queensland. From the nature of the case, however, the development of the Possession must be slow. The great energy of the administrator and his little staff, his singular tact in dealing with the natives, and his own scientific acquirements, are so many guarantees for steady progress, and it is well to remember that political and strategical reasons, rather than any great economic expectations, were the real purpose of the annexation. The Government is already reproached with not giving a free hand, or, indeed, encouragement, to land speculators and others who would undertake to "open up" the country; but apart from what Government may consider to be their duty as protectors of the natives, it must be remembered that the responsibility for results is on their shoulders, and also that the expenses of a native war would tax the resources of the country, or rather the Colonial subsidies on which the administration depends, beyond the point of endurance.

Nomenclature.—With regard to the appellations given by Sir W. Macgregor and Mr. H. O. Forbes respectively to the summits of Mount Owen Stanley and the neighbouring heights, a controversy has arisen of which we have not heard the last word.

It will be remembered that Mr. Forbes's journey was by two years the earlier; that in the end of October 1887, he arrived, as reported, at the bare flat-topped hill of Ginianumu, whence an easy slope led down to the Warumi valley below him, from the opposite side of which several spurs led directly up to the summit of Owen Stanley, which was plainly in view, and which, he estimated, allowing for the deceptive nature of the atmosphere, to be 8 or 9 miles away, though it appeared much nearer. He cannot, he says, be mistaken as to the identity of the mountain,

being familiar with it, and having sketched it repeatedly from various points of view, its general outline, besides, being very constant in appearance from all points to the southward. From his position at Ginianumu he accordingly took the bearings of six peaks, which he named after persons at home specially associated with New Guinea geography. Sir W. Macgregor, however, approaching the locality first (speaking roughly) at right angles, and afterwards in the opposite direction to Mr. Forbes's route, declares that he cannot identify any of these positions, and he has accordingly expunged them from his map or replaced them by others.

Mr. Forbes thinks the explanation may be that from Sir W. Macgregor's altitude, at the top of the mountain, it would be difficult to make out peaks which were far below him, and besides that, if he was depending only on a prismatic compass (his surveyor not having accompanied him as far as Mount Owen Stanley), he may, not being a professional surveyor, have been led into error as to his own position. I scruple even to criticise, and should certainly not presume to arbitrate between, the statements of two such distinguished and capable observers, and the more so as their maps, at certain important points, are imperfect or unfinished. Thus, in the first place, Sir William speaks of five great spurs, 12,000 feet in height, being thrown out by his "Mount Victoria," one of them at least in the direction of Mr. Forbes's advance; but none of these spurs are indicated on his map, and the space almost immediately beyond his peaks is left blank. On the other hand, some of Mr. Forbes's positions are confessedly imperfect (owing to the loss of some important notes), and his furthest point does not agree with the bearings taken thence of the peaks. This, however, is remediable from the bearings themselves, and although he also admits that his "depicting of the spurs and summits of Mount Owen Stanley is not satisfactory," his intended route to the summit is approximately clear. Comparing, then, the data on both sides, and allowing for the conditions under which they were taken, it does not appear that the discrepancies between the two accounts are by any means hopeless or incomplete. The latitude and longitude of the chief summit given by both explorers is almost identical, and as it is difficult to suppose that Mr. Forbes was deceived as to a physical feature with which he was so familiar, one is led to conclude that his "Huxley Pinnacle" must be one or other of the two highest peaks of Sir William's "Mount Victoria." A closer examination, indeed, suggests further points of agreement. It will be remembered that Sir William's crest consists of about six peaks, the two at the extremities being slightly the highest, while two others lie to the north of a line joining the two extreme peaks. Now Mr. Forbes observed three peaks (of which he names two) to the right, and two to the left, of a depression. The former may not improbably be the two which Sir William describes as being to the north of the line, when Mr. Forbes's two peaks to the left would be Sir William's terminal peaks—or, possibly, Mr. Forbes's Mount Walker may be the great spur which Sir William describes as running up to the central crest.

The mountain system is no doubt complicated. Some sketches are given with Sir W. Macgregor's map, one of which, "Mount Victoria from the south-east peak," appears, allowing for the difference of position, to give considerable support to Mr. Forbes's description.

It is much to be regretted that, before publishing his map and report, Sir W. Macgregor had not before him—as one must conclude he had not—the bearings of the peaks taken by Mr. Forbes, as well as the remarkable silhouette of their outline sent by him, and published for the first time in the R.G.S. 'Proceedings' for September last, the contours of which are so striking that, taken in conjunction with the bearings, they could hardly have failed to be identified.

It is to be hoped that the question may be satisfactorily solved by another

expedition proceeding along Mr. Forbes's route, which he still strongly maintains to be the easiest and most direct route to the summit.

Spanish Honduras. By W. Pilcher.—Mr. Pilcher visited Honduras in December 1889, leaving it the end of February 1890, and during that period travelled on muleback over 1000 miles, chiefly through that part of the country which lies on the Pacific side of the Cordilleras. From Amapala, the Pacific port, to Tegucigalpa, the capital, from thence to Inticulpa, in Olancho, then to Comayagua (the ancient capital), and the famous silver-mines of Opoteca, then to Yuscaran, in El Paraiso, another mining district, back again by another route to Olancho, and finally journeying again from Blancho through the capital to Amapala, and from there to La Union, Salvador, where the Pacific mail steamer was picked up, gives a brief outline of the country traversed. This comprises the well-known rivers Guayape and Jalun, in Olancho, where the gold-washing provides an easy living for the natives; an inspection of the old Spanish mines at Opoteca and Yuscaran, and at the latter place of the mining camps of the Americans and Germans now in full work; and, in addition, takes the traveller through and over the beautiful and fertile valleys and plateaus of this country, where tropical vegetation abounds, and coffee, rice, maize, sugar-cane, bananas, plantains, saccute, guavas, oranges, lemons, and other fruits are continuously produced without fear of frosts or adverse seasons. Herds of cattle and native horses are scattered over the country, and Honduras, with its natural advantages and its proximity to New Orleans (three days' steam from Puerto Cortez, the Atlantic port), presents to the foreign settler good opportunities for the successful employment of his capital in the raising of cattle and the production of the crops and fruits of the country. The paper contains comments upon the Government and present President, General Bogran, the food and climate of the country, and the courtesy and hospitality of its inhabitants, some figures and statements as to cattle raising, the cultivation of coffee, sugar-cane, and tropical fruits, concluding with the remark that the petty political disturbances which now and again occur in these Central American republics, may cause a temporary interference with business, but are in no way dangerous to the lives and property of foreign residents.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Berlin.—October 4th, 1890: Baron von Richthofen in the chair.—The Chairman first of all announced that two members of the Society, Dr. E. von Drygalski and Herr O. Baschin, would next year pay a visit to West Greenland (Disco Bay) for the purpose of studying, simultaneously with a Danish expedition to the east coast of Greenland, the movements of glaciers and the condition of the ice in that region. Their mission would be supported out of the funds of the Karl Ritter bequest.

Dr. Peters' Journey in the Interior of East Africa.

Dr. K. Peters then read a report upon his exploration of the Tana river. By the expedition of Dr. Peters two noteworthy facts concerning the geography of this region have been determined. The first is that above Hargazo, the supposed tributary from Mount Kenia in the north-west, the so-called Kiloluma, formerly appearing on our maps, has no existence. Its insertion in the maps is probably explained by a misunderstanding on the part of Krapf, who had heard from the Wakamba, that in their wanderings in this region they crossed a river Kiloluma.

But in the language of the Wakamba every noisy impetuous stream or waterfall is called Kiloluma. The natives give the name of Kiloluma more particularly to a series of rapids lying about 17 geographical miles above the supposed embouchure of the Kiloluma, at the point where the road from Ukamba to Ube crosses the Tana. In fact the whole upper course of the Tana which precipitates itself in a succession of cataracts, is known among the natives by the name of Kiloluma. The traveller who marched up stream and thoroughly explored this part of the Tana river, found no trace there of any large tributary. The second important fact determined by the Peters expedition is that the upper course of the river makes a very decided bend to the south-west; this is a new discovery. The Tana in its total course forms a letter S, inasmuch as its sources being in Mount Kenia, the Tana is identical with the Sagana discovered in Mount Kenia by Count Teleki. Its upper and lower courses are almost parallel to each other; both are connected by the curving middle portion running from south-west to north-east. As to the name of the river, Tana is a Suaheli designation. In Kikuja it is called Dsagana, in Ukamba, Dsana, among the upper Wapokoma, Dana. Perhaps Sagana is connected with the Bantu word *sag* meaning "mountainous." Among the Galla of Oda Boru Ruva the stream goes by the name of Galana, which signifies merely "water." The respective limits of the lower, middle, and upper courses of the Tana can be defined with a clearness possible in the case of but few rivers. The former extends from the mouth to Kidori, it is about 36 geographical (German) miles in length. This part of the course is exceptionally tortuous, and presents in some places the most remarkable curves, in consequence of the accumulated alluvial deposits. The middle course, which stretches from Kidori beyond Massa to Hargazo, exhibts less strongly marked bends; the banks have the character of steppes. The middle course is about 32 German miles long; its leading characteristic is the unbroken series of river-forkings and island formations, which commences more particularly at the Galla settlement of Oda Boru Ruva. The river bed is sandy, and the continual variations in the level of the waters cause a constant shifting of the islands, which are very fertile. Above Hargazo commences the upper course with its numerons cataracts and waterfalls, of which Peters counted about a hundred. Of these waterfalls the following are mentioned by the traveller as the most important—Hofmann Fall, Victoria Augusta Fall, Karl Alexander Fall, and the S-shaped Schweinfurth Fall. The appearance presented by the Victoria Augusta Fall is exceptionally beautiful; the spectator looks down upon it from the steep banks which here tower 400 to 500 feet above the stream. Behind Hargazo begins the ascent up the unbroken series of terraces which rise like steps one above the other. These terraces, although very picturesque in appearance, impede very much the advance of a caravan. The Mumoni Mountains, for example, with their steep-terraced slopes, overgrown with dense thorny undergrowth, occasioned great difficulties to the expedition. Camels, horses, donkeys perished, and many people fell sick. The Mumoni Mountains attain an elevation of from 7000 to 8000 feet. The climate is very mild, not suitable indeed, for the cultivation of tropical products on account of the night frosts. Kikuyumbi, which lies lower, has the most delightfully mild climate imaginable, as might be judged from the prosperity of its inhabitants and their comeliness. The decided bend of the stream to the south was the cause of great trouble to the traveller, as he was thereby diverted further and further from his goal, Wadelai. Twice Peters attempted, without success, to construct a bridge across the river at a convenient spot. The uncommonly rapid change in the water-level resulted in the bridge, which was almost completed, being torn away by the quickly rising waters ($4\frac{1}{2}$ feet in $1\frac{1}{2}$ hour). This sudden and rapid change in the level of the waters of

the upper Tana is one of its most remarkable peculiarities; it is due either to the heavy thunder-showers which fall in the mountain regions or to the sudden melting of snow masses, which, under the influence of the sunshine and in clear weather, takes place on the high mountain summits of Kenia, where the head-waters of the Tana lie. Compelled by the circumstances above-mentioned to march further along the southern bank than originally intended, the expedition arrived at last at the point where the river turns northward, after having passed the spot where Krapf probably saw the Tana. A clearly defined peak in this neighbourhood was named by Peters Krapf Hill. The party then crossed, with considerable difficulty, the Thika or Dika, which is a very important tributary, and further on the equally important Marawa river. Although the Tana proper turns in the direction of Mount Kenia —and of this the travellers were able to convince themselves from a view obtained from a summit near Konse, thus confirming Teleki's observations—Kikuyumbi, the country lying among the mountains to the west of Lake Naivasha, must be regarded as the proper head-waters of the Tana, in consequence of the masses of water which it receives from this quarter. The Tana is navigable for boats as far as Hargazo. In its lower and middle course the river flows through sun-scorched steppes sparsely covered with bush, mimosas, acacias, and tamarinds. On the banks the soil is fertile, but only for a little distance just parallel to the stream. A narrow belt of almost impenetrable virgin forest, extending only so far as the underground water reaches, accompanies the banks of the river in its middle course. The native paths leading through these forests to the shore of the river are extremely difficult to discover, so that an expedition marching along the stream outside this strip of forest runs the risk, on account of the impossibility of reaching the river through the dense woods, of perishing from thirst, even within sight of the river. The fauna of the country is of the usual East African type. The river abounds in crocodiles and hippotami. In the uninhabited mountain districts elephants, rhinoceroses, buffaloes and antelopes, as well as lions, leopards and monkeys are numerous. In the sun-scorched steppes, where in the day the temperature reaches 113° F. and at night rarely falls below 86° F., but where, however, the excessive dryness makes the heat endurable, the Wapokomo and the hunting tribe of the Waboni dwell. From Kindori onward, the country is inhabited by Galla tribes, who, however, are hard pressed by the Somali. Beyond Hargazo dwell a Masai tribe, the Wandorobbo, with whom the expedition, much against their inclination, had to fight. By means of the cattle captured here as booty, the expedition was enabled to accomplish a march across the uninhabited Mumoni range, without running the risk of starvation. Following on this Masai tribe come various Bantu tribes, the Wadsagga, Wakamba and Wakikuyu. They speak similar languages and belong apparently to the same race, which, according to existing traditions, at one time dwelt on Kilima-njaro. They are clever in constructing their huts and in mat-making, as well as in smelting iron. They had never before seen a white man. Nevertheless they were uncommonly intrusive and thievish; and it was only by very energetic action that the expedition was able to save itself from being robbed and destroyed; Count Teleki had the same experience. The aristocratic republican constitution of these peoples does not allow of peaceable commercial relations being easily established with them through the medium of influential chiefs. In spite of the beautiful landscape of Kikuyu, with its oak woods and its cool temperature (in the evening, about 8 o'clock, 52°–55° F., in the night 41°–43°), Peters does not believe that the Tana route will prove to be of any practical importance in connection with the opening up of the Baringo region, unless, in the direction north-west of the Tana bend at Hargazo, there should be found a more practicable route through the mountainous districts of the Kaiser Wilhelm II. and Beningsen ranges (which

Peters, viewing them from Oda Boru Ruva, took to be the Kenia Mountains); and this must be taken as doubtful. The uninhabited and foodless savannas, and the almost impassable mountain tracts, present, as the two expeditions of Pigott and Smith demonstrated, almost insuperable difficulties for caravans. The routes from Mombasa used by the caravans continue to be preferable. If the waterways of the Tana and the Juba had not been obstructed further in the interior by mountains difficult of access, the Arabs would very probably have taken advantage of them long ago.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Höck, [Dr.] J.—Nährpflanzen Mitteleuropas, ihre Heimat, Einführung in das Gebiet und Verbreitung innerhalb desselben. (Forschungen der deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Fünfter Band, Heft 1.) Stuttgart, J. Engelhorn, 1890: 8vo.

Macdonell, Arthur A.—Camping Voyages on German Rivers. London, E. Stanford, 1890: 8vo., pp. xvi. and 278. Price 10*s.* 6*d.* [Presented by the Publisher.]

Reminiscences of boating excursions on the Werra, Weser, Neckar Rhine, Moselle, Main, Moldau, and the Elbe, and the Danube, with notices of the scenery, people, and historical associations of the river valleys described. A number of trustworthy maps, reproduced from those of the German Ordnance Survey, illustrate the volume, which will serve as a guide-book to the principal rivers of Germany.

Partsch, [Dr.] Joseph.—Kephallenia und Ithaka. Eine Geographische Monographie. 'Petermann's Mitteilungen,' Ergänzungsheft No. 98. 4to., pp. [iv.] and 108. Gotha, Perthes.

This is one of those exhaustive geographical monographs produced only in Germany. It deals with all geographical aspects of the islands of Cephallenia and Ithaca. There are maps of the islands on the scale of 1: 100,000, and plans of old Samos and Kranos.

Scott, Robert, H. [F.R.S.]—The Variability of the Temperature of the British Isles, 1869–1883, inclusive. [From the 'Proceedings of the Royal Society,' vol. 47.] [1890.] 8vo., diagram.

Zacharias, [Dr.] Otto.—Zur Kenntnis der niederen Tierwelt des Riesengebirges nebst vergleichenden Ausblicken. (Forschungen zur deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Vierter Band, Heft 5.) Stuttgart, J. Engelhorn, 1890: 8vo., illustrations.

ASIA.

Blanford, Henry F. [F.R.S.]—An Elementary Geography of India, Burma, and Ceylon. London, Macmillan & Co., 1890: 8vo., pp. vii. and 191. Price 2*s.* 6*d.* [Presented by the Publishers.]

This is a volume of Macmillan's Geographical Series. No one is better qualified than Mr. Blanford to write such a text-book, and it need scarcely be said that the meteorology is particularly well done. Of course, within so small a space, only the most characteristic and important features are referred to; but probably no more complete and satisfactory sketch of Indian geography exists within so limited a compass. It is a great advantage to a book of this kind that the author has himself been able to visit most parts of the country about

which he writes. The illustrations are representative, and well selected. The first 46 pages are devoted to India generally, the first few pages dealing with the influence of India's geography on its people. A second short section treats of the government of India and of its princes; followed by descriptions of each of the provinces, as one of which Ceylon, unintentionally, of course, is made to figure. The concluding sections deal shortly with foreign possessions in India, and with the frontier States of Afghanistan and Nepal.

[**India.**]—East India (Progress and Condition). Statement exhibiting the Moral and Material Progress and Condition of India during the year 1888-9. London, Eyre & Spottiswoode, 1890: folio, pp. 214. Price 1*s.* 9*d.*

Humann, Karl, and Puchstein, Otto.—Reisen in Kleinasien und Nord Syrien. Berlin, Dietrich Reimer, 1890: 8vo., pp. 424, with 3 maps, 53 plates, and numerous woodcuts.

Two of the journeys recounted in this volume were made under the directorship of Herr Karl Humann, and at the expense of the Royal Museum of Berlin, to obtain casts of certain remarkable rock sculptures at Yasili Kaya, near Angora; to examine the ruins at Boghaz Koi, not far from that spot which M. Texier had correctly stated to be those of Pteria, mentioned by Herodotus (1.76), and to make casts of the colossal remains around the tumulus of the Kommagenean kings in Nemrud Dagh near the Euphrates.

A third journey of exploration made by Herr Puchstein is also given, and on the information obtained by this traveller, the second of Herr Humann's journeys was undertaken at the instigation of Mommsen of the Berlin Museum.

On both occasions Dr. Kiepert provided the expeditions with maps compiled from all the geographical material of previous travellers, and Herr Humann was able to supply deficiencies in these, and correct inaccuracies with the aid of surveying materials which he took with him, though he had such difficulties with his horse and watch, that he confesses at last to "a certain indifference in these matters."

Herr Humann is well known to archæologists as the superintendent of those large works of excavation undertaken by the German Government at Pergamon, which have so materially improved the collection of Greek antiquities at Berlin; it was on the conclusion of these works that he started for Angora (Ancyra) in the summer of 1882. The journey extended from Broussa in Bithynia to Samsoun on the Black Sea, and was performed with carts and carriages along the old caravan road to Angora, and the notes taken by Herr Humann on this route were no doubt of great value to the enterprising German company which has just undertaken to extend the Haidar Pasha railway as far as Angora. The expedition was supported by both the Austrian and German Governments, two skilled plaster-casters accompanied it, and the Austrians supplied an able epigraphist. The rock sculptures of Yasili Kaya have been minutely described by several travellers, by Professor Ramsay, Texier, and others. Herr Humann, however, has conferred a boon on archæology by bringing casts of these curious reliefs—which show more than almost anything else the influence of Assyrian art in Asia Minor—safely home to Berlin, where they can be studied by experts at their leisure.

The ruins of the old town of Pteria were accurately surveyed and photographed by the expedition, which material will form a valuable addition to the accounts given by Perrot and Chipiez, Hirschfeld and Ramsay.

Herr Humann gives an interesting account of the Kizil-bashi, the "red-heads," as the Turks contemptuously call them, whom he met on his route. They practise a religion in secret, they take bread and wine at their ceremonies, and have other traces of Christian influence. They are peculiar for their cleanliness, well-kept villages and fields, well-regulated family life, and the absence of syphilitic diseases, so common amongst the Turks and Armenians. Hence Herr Humann is inclined to disbelieve the stories circulated by the Turks concerning their private life, and to look upon them as decayed Christians, superior in every way to the nationalities around them. "It is certain that they have been longer in the country than the Turks, and probably one would more

readily find amongst these despised Kizil Bashi traces of the ancient Galatians than amongst the Turks and Armenians."

The two other journeys described in this volume, to Nemrud Dagh in the Upper Euphrates valley, are decidedly more interesting and fuller of newer material. Herr Otto Puchstein performed the first in company with Charles Sester, a German engineer, who held the post of chief engineer of the *Vilayet* of Diabekir. Charles Sester is the first modern traveller who visited the tumulus and colossal statues of the Nemrud Dagh in 1880, and under his guidance Herr Puchstein went in 1882. Curiously enough, these wonderful remains are mentioned neither in classical nor modern literature, though they formed the burial place for the Kings of Kommagene of the Seleucide line. It would appear that Antiochus I. of Kommagene (a district carved out of the Alexandrian Empire, north of the upper Euphrates Valley) caused this tumulus to be erected as a family burial place with the colossal statues around it, excellent reproductions of which are given in the volume before us. He employed to construct them the people around him. Without any knowledge of art, "Hellenized barbarians," as Karl Humann calls them, their work is colossal but exceeding coarse, just what one would expect from people who had a faint idea of Greek statuary. They are interesting only for the costumes, and for the unravelling of local history, which up to this has been entirely unknown, and towards which the vast epigraphical material produced in this volume affords interesting material for the historian to work upon.

The journey performed by Herr Puchstein is full of valuable geographical information. His tabulated details of the route, which occupies fifty pages of the work, is admirably executed, and must have been invaluable for the second expedition which Humann undertook to obtain the casts.

Again Kiepert supplied a map, again two plaster-casters accompanied them, and Dr. von Luschau, the celebrated Austrian archæologist, whose work in Lycia was so well carried out, and described in a volume similar to the one before us. They succeeded also in obtaining a valuable Syenite relief for the museum at Berlin. Alexandretta was the starting point chosen. They then proceeded, by way of the Amanus Pass and Aintab into the Euphrates valley. At Samosata, the ancient capital of the Kommagene, they left the river and proceeded northward to the range of mountains which enclose the ruins of the monuments to the Kommagenian kings. At Karakusch and Seronk similar tumuli and remains of statues on columns were sighted, and reproductions are given of them in the plates; but their great work was thoroughly to investigate the colossal statues of the Nemroud Dagh, and give to the world an account of a race of kings who ruled in this district after the days of Alexander, and who only succumbed to the Roman power in the days of Vespasian.—[J. T. B.]

Oliver, Edward Emmerson.—Across the Border; or, Pathân and Biloch. Illustrated by J. L. Kipling, C.I.E. With a map showing the location of all the tribes and the surrounding countries. London, Chapman & Hall: 8vo., pp. xi. and 344 Price 14*s*.

The author, who is a Member of the Institution of Civil Engineers, and Under-Secretary, Department of Public Works at Lahore, states that the origin of the present work was in a suggestion that such information as was available regarding the leading border tribes on our north-western Indian frontier, the policy which has of late been adopted towards them, and the topography of the districts they inhabit, would be appreciated by Indian readers, which led to the publication in a Lahore paper of a series of twenty-four articles dealing with the subject. These were followed from time to time by articles contributed to the *Civil and Military Gazette* and the *Pioneer*. Some of the latter have been recast, and the whole brought together in the present volume, the author considering that, owing to the increasing attention now given to Indian affairs, some handy account of the most important frontier people might be acceptable to the general public. Mr. Oliver's long official acquaintance with the subject treated of renders him peculiarly qualified for the work he has undertaken, and a safe guide for any seeking information about the wild country and tribes lying to

the west of our Eastern Empire; while his vigorous and lively style renders the book so interesting and amusing, that none who have once dipped into it are likely to put it down again until they have read to the end; and not the least valuable part of the work is the excellent map accompanying it.

AFRICA.

[Egypt.]—Société Khédiviale de Géographie. L'Égypte et la Géographie. Sommaire historique des Travaux Géographiques exécutés en Égypte sous la Dynastie de Mohammed Aly, par le Dr. Frédéric Bonola, Bey. Le Caire, 1890: 8vo., pp. 118. [Presented by the Author.]

A summary of the geographical work executed in Egypt from 1805 to within a recent period.

[Slave Trade in Africa.]—La Traite des Esclaves en Afrique. Renseignements et documents recueillis pour la Conférence de Bruxelles (1840 à 1890). Bruxelles, J. Hayez, 1890: folio, pp. xi. and 264, map.

AMERICA.

Bell, Charles N.—Continuation of Henry's Journal, covering Adventures and Experiences in the Fur Trade on the Red River, 1799–1801. (The Historical and Scientific Society of Manitoba. Transactions, Nos. 35 and 37. Season 1888–9.) [Bound up with this No. is Transaction No. 36, consisting of a paper entitled "Lord Selkirk's Deed from the Hudson's Bay Co.," by Mr. James Taylor.] Winnipeg, 1889: 8vo., pp. 21.

Bolivia.—Diccionario Geografico de la Republica de Bolivia. Tom i. Departamento de la Paz: por Manuel V. Ballivian y Eduardo Idiaquez. La Paz, 1890: 4to., pp. 164.

The geographical dictionary of Bolivia, of which the first edition has just been received, is announced to be a tentative issue, with a view to the publication of a more correct and complete edition hereafter. It is, however, a useful and creditable work in itself; and is designed to contain descriptions of the provinces and cantons, as well as of the towns, villages, and estates (*haciendas*) in each department. The work is based upon the topographical collections made by Don Juan Ondarza, the zealous and laborious compiler of the map of Bolivia, a copy of which is in the R.G.S. map-room, and of the accompanying geographical work. Ondarza was a native of Chuquisaca, and an officer in the Bolivian Corps of Engineers. He died in 1875, leaving a great mass of valuable geographical material, which will now be utilised by successors who fully appreciate his labours. Ondarza devoted his life to geographical work, and never received the notice, either in his own country or in Europe, that his labours undoubtedly deserved.—**[C. R. M.]**

——— Exploraciones y noticias hidrograficas de los Rios del norte de Bolivia, publicados por M. V. Ballivian. La Paz, 1890: 8vo., pp. 69.

This pamphlet comprises several notices of expeditions to explore the almost unknown region between the rivers Beni, Madre de Dios, and Purus, in the extreme north of Bolivia. Some of the notices are translations. They include the narrative of the Brazilian Colonel Labre, which appeared in the R.G.S. 'Proceedings' for August 1889; another paper on the exploration of the Ituxy, read before the Geographical Society of Rio de Janeiro; an interesting account of a journey to the Rio Acre, by a young Bolivian named Victor Mercier; a paper on the province of Caravaya, by our Associate Dr. Raimondi, from the *Ateneo de Lima*; and a paper on the navigability of rivers in the department of La Paz, by Dr. Armentia. The collection is a useful one, and Señor Ballivian has done good geographical service in bringing it together.—**[C. R. M.]**

——— La Paz de Ayacucho. Relacion historica, descriptiva y commercial, por Julio Cesar Valdès. La Paz, 1890: 8vo., pp. 33.

——— La Meseta de Los Andes. Cuarta Conferencia dada por el Dr. Augustin Asplazu, Presidente de la Sociedad Geografica de La Paz. La Paz, 1890: 8vo., pp. 11. [The above publications have been presented by our Honorary Corresponding Fellow, Don M. V. Ballivian.]

——— Colonization del territorio de Otuquis, en el Departamento de Santa Cruz. La Paz, 1890: 8vo., pp. 96.

——— Descripcion de la Nueva Provincia de Otuquis en Bolivia. Segunda edicion, corregida y aumentada por Mauricio Bach . . . ano 1842. Reimpresion publicada por el Dr. Antonio Quijarro. Buenos Ayres, 1885: 8vo., pp. 36, map. [Presented by Dr. Antonio Quijarro.]

The publication of the former pamphlet by Don Antonio Quijarro has reference to a proposal by the Paraguayan Development Company to found a port and establish an agricultural colony on the river Otuquis, an important Bolivian tributary of the Paraguay. Señor Quijarro gives an account of previous efforts to open up the valley of the Otuquis, and especially refers to what was said by Mr. Clements Markham on the subject when the paper on the rivers of the Gran Chaco, by Captain Page, was read at the R.G.S. meeting on January 28th, 1889. He also reprints a pamphlet published by Captain Fernandez, of the Argentine Navy, on the navigability of the Otuquis; and an interesting letter, by Captain Page, on the exploration of that river by his father, in 1852, with useful advice respecting the construction of a steamer.

As its title shows, the latter work is a reprint of a description of the province.

These publications denote considerable activity among the explorers and geographers of Bolivia. Señor Ballivian bears an honoured name, well known to students of the literature of South America. With such coadjutors as the Señores Quijarro and Idiaquez good work will no doubt continue to be done, of which these volumes are the very promising and satisfactory commencement.—**[C. R. M.]**

[Cape Horn.]—Ministères de la Marine et de l'Instruction Publique. Mission Scientifique du Cap Horn 1882–1883. 5 vols. Paris, Gauthier Villars: 4to. (vol. i. 1888) pp. ix. and 496; (vol. ii. 1885) pp. 40, 284, and 202; (vol. iii. 1886) pp. viii., 356, and 90; (vol. iv. 1887) pp. 249; (vol. v. 1889) pp. 400.

The French Scientific Mission to Cape Horn was executed in the years 1882–83, principally with the object of obtaining meteorological and magnetical observations at this particular part of the globe. Vol. I. contains a history of the Expedition, by the Commander, L. F. Martial, describing in detail the voyage out from Cherbourg, and an account of the explorations in the neighbourhood of Cape Horn; there are also chapters dealing with Ethnography and Hydrography, and the English Evangelical Mission at Ooshooia; this volume also deals largely with Meteorology, and is illustrated with three maps besides a number of well-executed plates. Vol. II. treats of the meteorology, by J. Lephay, with maps and diagrams. Vol. III. consists of two parts: the first deals with Terrestrial Magnetism, by F.-O. Le Cannellier; the second, with Researches on the Chemical Constitution of the Atmosphere, after the experiences of Dr. Hyades, by A. Müntz and E. Aubin, with plates. Vol. IV., Geology, by Dr. Hyades, with maps and plates. Vol. V., Botany, by P. Hariot, P. Petit, J. Muller d'Argovie, E. Bescherelle, C. Massalongo, and A. Franchet, with maps and plates. As will be seen, the present work is an important contribution to our scientific knowledge of this portion of the earth's surface.

Davis, William Morris, [and] Wood, J. Walter.—The Geographic Development of Northern New Jersey. [From the 'Proceedings' of the Boston Society of Natural History, vol. xxiv., 1889.] 8vo., pp. 365 to 423. [Presented by Mr. William Morris Davis.]

Apart from the useful information contained in this essay, it may be taken as a good example of research in physical geography.

Holmes, William H.—(Smithsonian Institution, Bureau of Ethnology.) Textile Fabrics of Ancient Peru. Washington, 1889: 8vo., pp. 17, illustrations.

Kate, [Dr.] H. F. C. Ten (Jr.)—Reizen en Onderzoekingen in Noord-Amerika. Leiden, E. J. Brill, 1885: 8vo., pp. 464, map and plates. [Presented by the Author.]

Kate, [Dr.] H. Ten.—Legends of the Cherokees. [Reprinted from 'Journal of American Folk-Lore,' vol. ii., No. iv.] 8vo. [Presented by the Author.]

——— Sur les Cranes de Lagoa-Santa. Paris, Typ. A. Hennuyer, 1885: 8vo., pp. 7. [Presented by the Author.]

——— Zuñi Fetiches (Separat-Abdruck aus: "Internationales Archiv für Ethnographie," Bd. iii., 1890: 4to., pp. 2, plate. [Presented by the Author.]

Marquina, Paulino Rodriguez.—República Argentina. La Provincia de Tucuman. Breves apuntes. Tucuman, 1890: 8vo., pp. 20.

Payne F. F.—A Few Notes upon the Eskimo of Cape Prince of Wales, Hudson's Strait. [From the Proceedings of the American Association for the Advancement of Science, 1889.] 8vo.

Pilling, J. C.—(Smithsonian Institution, Bureau of Ethnology.) Bibliography of the Muskhogean Languages. Washington, 1889: 8vo., pp. v. and 114.

——— (Smithsonian Institution, Bureau of Ethnology. J. W. Powell, Director.) Bibliography of the Iroquoian Languages. Washington, 1888: 8vo., pp. vi. and 208.

Powell, J. W.—Eighth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1886–87 (in two parts). Washington, 1889, 4to., pp. xix. and 1061. [Presented by the Director of the Survey.]

The present volume opens with the usual Report of the Director, and Administrative Reports. The accompanying papers include "The Quaternary History of Mono Valley, California," by Israel C. Russell, including its lacustral history, glacial history, and phenomena, and volcanic history; "The Geographical Distribution of Fossil Plants," by Lester F. Ward. Other papers are chiefly of geological interest. The Report is illustrated throughout with a number of maps and illustrations.

Thomas, C.—(Smithsonian Institution, Bureau of Ethnology.) The Problem of the Ohio Mounds. Washington, 1889: 8vo., pp. 54, illustrations.

——— (Smithsonian Institution, Bureau of Ethnology.) The Circular, Square, and Octagonal Earthworks of Ohio. Washington, 1889: 8vo., pp. 33, illustrations.

Villamil de Rada, [Dr.] Emeterio.—La Lengua de Adan y el Hombre de Tiahuanaco. Con una introduccion del Doctor Nicolás Acosta. La Paz, 1888: 8vo., pp. 76, xiv., and 249.

AUSTRALIA.

East, J. J.—On the Geological Structure and Physical Features of Central Australia. 'Transactions and Proceedings of the Royal Society of South Australia,' vol. xii., 1888–89, pp. 31 to 53.

ARCTIC.

Macfarlane, R. R.—Land and Sea Birds nesting within the Arctic Circle in the Lower Mackenzie River District. (The Historical and Scientific Society of Manitoba. Transaction No. 39. Season 1888–9.) Winnipeg, 1890: 8vo., pp. 35.

GENERAL.

Darwin, Charles.—On the Structure and Distribution of Coral Reefs; also Geological Observations on the Volcanic Islands, and parts of South America, visited during the voyage of H.M.S. *Beagle*. (The Minerva Library of Famous Books, edited by G. T. Bettany, M.A., B.SC.) London, &c., Ward, Lock, & Co., 1890: 12mo., pp. xx. and 549, maps and illustrations. Price 2*s*. [Presented by the Publishers.]

This volume consists of a reprint of Darwin's celebrated works mentioned above, with a critical introduction to each, by Professor Judd, which makes the present edition of special value.

Davis, William Morris.—Structure and Origin of Glacial Sand Plains. From 'Bulletin of the Geological Society of America.' Washington, 1890: 8vo., pp. 195 to 202. [Presented by the Author.]

The author seeks to show that it is difficult to find any explanation for American sand plains other than the one generally current, which regards them as delta-like deposits of sand and gravel, washed, in the closing stages of the last glacial epoch, from the irregular front of the melting, stagnant ice-sheet into bodies of water that bathed its edge.

Elderton, William A.—Maps and Map Drawing. Macmillan's Geographical Series. Price 1*s*.

Though this little book will serve as a useful introduction to higher works on surveying and map projections, much that it contains can hardly be said to be suited for the use of schools. For instance, it is extremely unlikely that the scholar of average ability would gain much by the descriptions given of surveying instruments. The only way in which a useful knowledge of the part they play in a survey can be gained, is from the actual use of the instruments in the field; and those who have given instruction in surveying know that, even with instruments before them, it is often by no means easy to make pupils understand how to use them properly. The most useful part of the book, from an educational point of view, is the chapter on "Memory Maps," which contains some very practical hints. Taken as a whole, 'Maps and Map Drawing' appears to be better suited for the use of teachers, to many of whom it will doubtless prove a handy book of reference.—[**J. C.**]

Fiorini, M.—Gerardo Mercatore e le sue Carte geografiche. Roma, 1890: 8vo., pp. 88. [Presented by the Author.]

A sketch of the life and contributions to cartography of Gerard Mercator.

Frazer, J. G. [M.A.]—The Golden Bough: a Study in Comparative Religion. London, Macmillan & Co., 1890. Two vols., 8vo. Vol. i., pp. xii. and 409; ii. pp. 407. Price 28*s*. [Presented by the Publishers.]

These volumes are a monument of minute and well-ordered research on the part of the author. They throw a vast deal of light on primitive religious beliefs and customs, and the wealth of information which Mr. Fraser has brought together from all parts of the world may prove useful even to the geographer.

Green, W. L.—Notice of Prof. Jas. D. Dana's 'Characteristics of Volcanoes.' Honolulu, H.I, 1890: 8vo., pp. 15.

Günther, [Prof. Dr.] Siegmund.—Handbuch der Mathematischen Geographie Mit 155 Abbildungen. Stuttgart, Engelhorn, 1890: 8vo., pp. xvi. and 793. Price 14*s*. 3*d*.

This is a volume in the series of Geographical Handbooks which are being published under the editorship of Professor Ratzel. It need hardly be said that Dr. Günther has treated the subject with scientific method and thoroughness, and any student who can easily read German will probably find the book the most satisfactory of its kind. Dr. Günther introduces the subject by a most interesting historical résumé of the conceptions of geography which have prevailed at different periods.

NEW MAPS.

(By J. Coles, *Map Curator*, R.G.S.)

EUROPE.

Andorra.—Map of ——, constructed by F. H. Deverell, 1890. Based on the scale of the French Ordnance Survey map (Carte de l'État-Major). Scale 1 : 80,000 or 1·1 geographical miles to an inch. F. S. Weller, lith., London.

The material for the construction of this map has been collected by the author during a series of visits to Andorra, extending over several years. It is drawn on the same scale as the large French Government map (viz. 1 : 80,000), and contains a great deal of new information. All the boundaries of the *parróquias* are shown, roads and mule-tracks are laid down, and the heights of mountains are given in both metres and feet. So little is known of the small State of Andorra that Mr. Deverell's map is a welcome addition to the Map-room collection.

Danmark.—Generalstabens topographiske Karte over ——. Scale 1 : 40,000 or 1·8 inches to a geographical mile. Kalchographeret og graveret ved Generalstaben. Kjöbenhavn, 1889. Sheets, "Allinge," "Skivt," "Skjörping," "Struer." (*Dulau.*)

Deutschen Reiches.—Karte des ——. Herausgegeben von der Kartogr. Abteilung der Königl. Preuss. Landes-Aufnahme. Sheets:—414, Zeitz; 422, Liegnitz; 502, Neuerberg. Scale 1 : 100,000 or 1·3 geographical miles to an inch. 1890. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Kephallenia und Ithaka.—Originalkarte der Inseln ——. Auf Grund der Englischen Seekarte und eigener Beobachtung entworfen und gezeichnet von Prof. Dr. J. Partsch. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 98, Tafel 1. Gotha, Justus Perthes. (*Dulau.*)

—— Plan der alten Stadt Same. Nach eigenen Aufnahmen im Massstab 1 : 10,000 or 7·3 inches to a geographical mile.—Plan der alten Stadt Krane. Nach eigenen Aufnahmen im Massstab 1 : 10,000 or 7·3 inches to a geographical mile. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 98, Tafel 2. Gotha, Justus Perthes. (*Dulau.*)

Lombardia.—Carta geologica della ——. Scale 1 : 250,000 or 3·4 geographical miles to an inch. Esequita del Prof. Cav. Torquato Taramelli. Milano, Ferd. Sacchi e Figli. Price 7*s.* (*Dulau.*)

Mittel-Europa.—Neue Generalkarte von ——, 1 : 200,000 or 2·7 geographical miles to an inch. Herausgegeben vom k. k. milit.-geograph. Institute. Wien. Lief. 3: (12 sheets) Lundenburg, Troppau, Krakau, Radom, Lublin, Siedice, Turks, Zamosé, Máramaros, Sziget, Luck, Piask, Starokonstantynóro. Lief. 4: (8 sheets) Oświęcim, Debreczen, Munkács, Kowel, Kobrin, Drogiezyn, Rokitno, Zytomir. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued since the 15th September, 1890.

1-inch—General Maps:—

England and Wales: New Series, with contours. No. 89, Brigg, Redbourne, Caistor, Blyborough, &c. No. 139, Stafford, Stone, Newport, Eccleshall, &c.; No. 185, Northampton, Daventry, Spratton, &c. 1*s.* each.

25-inch—Parish Maps:—

England and Wales: **Lancashire**: CX. 1, 4*s.*; 2, 3, 4, 5*s.* each; 7, 9, 4*s.* each. **Yorkshire**: CXLV. 1, 4*s.*; 2, 3*s.*; 3, 4*s.*; 4, 5, 3*s.* each; 6, 4*s.*; 7, 8, 3*s.* each; 9, 4*s.*; 11, 3*s.*; 13, 14, 15, 16,

4*s.* each; CLIII. 9, 3*s.*; 10, 11, 12, 13, 14, 4*s.* each; CLXXI. 7, 4*s.*; CCIX. 1, 4*s.*; 3, 3*s.*; 5, 7, 10, 12, 4*s.* each; 15, 5*s.*; CCXXIII. 1, 2, 3, 4, 5, 6, 10, 11, 13, 4*s.* each; 14, 16, 5*s.* each; 8, 4*s.*; CCXXIV. 1, 3*s.*; 2, 3, 7, 9, 4*s.* each; 13, 5*s.*

Town Plans—10-feet scale:—

England and Wales: **Heckmondwike,** CCXXXII. **9,** 25, 5*s.*; CCXXXII. **10,** 16, 21, 23, 24, 5*s.* each; CCXXXII. **14,** 2, 3, 4, 8, 9, 5*s.* each (coloured). **Huddersfield,** CCXLVI. **15,** 20, 4*s.* (coloured). **Knaresborough,** CLIV. **12,** 1, 6, 4*s.* each; 7, 5*s.*; 13, 4*s.*; 17, 5*s.* (coloured). **Leeds,** CCIII. **13,** 24, 2*s.* 6*d.* **Liverpool,** XCIX. **9,** 7, 12, 5*s.* each; 13, 4*s.*; 16, 3*s.*; 17, 5*s.*; 22, 3*s.*; 23, 24, 5*s.* each; XCIX. **10,** 21, 4*s.*; XCIX. **13,** 2, 3*s.*; 3, 4, 5, 5*s.* each; 10, 4*s.*; 15, 5*s.*; 18, 3*s.*; 19, 20, 5*s.* each; 22, 24, 3*s.* each; 25, 5*s.*; XCIX. **14,** 1, 6, 4*s.* each; 11, 12, 13, 4*s.* each; 16, 17, 5*s.* each; 18, 19, 3*s.* each; 20, 4*s.*; 21, 8*s.*; 22, 5*s.*; 23, 4*s.*; 24, 2*s.* 6*d.*; XCIX. **15,** 16, 21, 5*s.* each (coloured). **Manchester and Salford,** CIV. **2,** 4, 5, 7, 8, 9, 16, CIV. **6,** 1, 6, 11, 2*s.* 6*d.* each. **Sheffield,** CCXCIV. **4,** 19, 24, 5*s.* each; CCXCIV. **7,** 7, 8, 12, 5*s.* each; 15, 8*s.* (coloured); CCXJIV. **8,** 4, 6, 8*s.* each; 8, 5*s.*; 11, 8*s.*; CCXCV. **1,** 21, 5*s.* (coloured). **Southport,** LXXV. **9,** 10, 8*s.*; 14, 5*s.*; LXXV. **13,** 18, 20, 5*s.* each; LXXV. **14,** 6, 5*s.* (coloured). **Ulverston,** XVI. **3,** 10, 4*s.*; 15, 5*s.* (coloured). **Wigan,** XCIII. **4,** 17, 22, 3*s.* each; XCIII. **7,** 9, 4*s.*; 10, 14, 3*s.* each; 19, 4*s.*; 20, 8*s.*; 24, 25, 5*s.* each; XCIII. **8,** 3, 4*s.*; 6, 7, 8, 5*s.* each; 11, 12, 8*s.*; 13, 5*s.*; 16, 17, 8*s.* each; 18, 19, 5*s.* each; 21, 8*s.*; 22, 5*s.*; 23, 24, 4*s.* each; XCIII. **11,** 5, 10 5*s.* each; XCIII. **12,** 1, 5*s.*; 2, 4*s.*; 3, 4, 5*s.* each; 6, 7, 3*s.* each; 8, 5*s.* (coloured).

(*Stanford, Agent.*)

AFRICA.

Binger, Captain L. G.—Carte du Haut-Niger au Golfe de Guinée par le Pays de Kong et le Mossi, levée et dressée de 1887 à 1889 par L. G. Binger, Cap^ne^ d'Inf^rie^ de Marine, par ordre de M. Étienne, Sous-Secrétaire d'État des Colonies. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Service géographique des Colonies. Paris. 4 sheets. (*Dulau.*)

This map contains a large amount of detail, with reference to this part of Africa, that is not to be found elsewhere. The routes followed by Captain Binger are shown in red, those of other travellers being also given. The map is coloured in two shades of pink, the darker shade indicating the area of the French protectorate, the lighter including the countries situated within the zone of the French Sphere of Influence. On inset maps are shown the lower course of the Comoé or Akba, from a compass survey made by Captain Binger in 1889; and the lagoons of Grand Bassam and Assinie from surveys of Captain Binger and other most recent material. A table of positions fixed by observations is also given.

The map is clearly drawn, and the work it contains fills up several blanks on the map of this part of Africa.

Deutsch-Ostafrika.—Handkarte von ——, Scale 1: 3,000,000 or 41·6 geographical miles to an inch. Von Kettler. Weimar, Geographical Institute. Price 1*s.* (*Dulau.*)

Peters' Route in East Africa.—Vorläufige Uebersicht von Dr. Karl Peters' Reise in Ostafrika im Jahre 1889–90. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Gesellschaft für Erdkunde zu Berlin. Sitzung vom 4. Oktober 1890. (*Dulau.*)

Teleki's Explorations in East Africa.—Bergprofil Sammlung während Graf S. Teleki's Afrika Expedition 1887–88, aufgenommen von Linienschiffslieutenant Ludw. Ritt. v. Höhnel. Als Manuscript gedruckt im k. u. k. milit. geogr. Institute in Wien. 1890. (*Dulau.*)

The manner in which the results of Count Teleki's survey are recorded in this field-book, may well serve as a model for all explorers. The book consists of thirty large pages, each of which contain very clearly drawn panoramas; the bearing of each prominent peak is written above the peak itself, notes being given of the date, and the place from which the bearings were taken. The map which accompanies the field-book is beautifully drawn, the topographical features of the country being shown by contours. The area embraced extends from latitude 5° 45′ S. to 5° 45′ N., its northern limits in longitude being from 34° 30′ E. to 37° 20′ E. and its southern limits from 35° 50′ E. to 38° 45′ E.; it thus includes all the country between the coast at Pangani, and the northern end of Lake Rudolf. The route followed is shown by a black line,

while the portion of the country shown in the panoramas, as well as the point from which the sketch was made, are indicated by a series of red lines and segments of circles, each of which has a number corresponding with the number of the panorama in the field-book.

The whole system adopted is worthy of the highest praise, and exhibits a method of recording observations, which if generally followed by explorers, would greatly tend to accuracy in the maps which have to be produced from their notes.

AUSTRALIA.

Süd-Australien.—Karte der Gegend zwischen Lake Eyre und den Musgrave Ranges in ——. Hauptsächlich nach der Originalkarte und dem Berichte des Henry Y. L. Brown, F.G.S. Scale 1 : 2,500,000 or 34·2 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 18. Gotha, Justus Perthes, 1890. (*Dulau.*)

CHARTS.

North Atlantic Ocean.—Pilot Chart of the North Atlantic Ocean, October 1890. Published monthly at the Hydrographic Office, Navy Department, Washington, D.C. Richardson Clover, Lieut. U.S.N., Acting Hydrographer.

ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par ——. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Hachette et Cie., 1890. 21e Livraison. Price 10*d.* (*Dulau.*)

Part 21 of this atlas contains maps of France, some of her colonies, and Indo-China. On sheet 11 there are two excellent maps of France, one orographical and the other geological, the latter being accompanied by geological sections of the Jura and Mont Blanc. The colours by which the different formations are indicated are well chosen, and the registering is perfect. Sheet 19 contains maps of French Indo-China, Madagascar, Réunion, the French possessions in the Congo District and Senegal, and the French Soudan. Sheet 42 is a general map of Indo-China. In the letterpress which accompanies the maps, a general summary of information with regard to the physical and political geography is given. The writers in this part of the atlas are MM. Margerie and Jacottet, their notes being illustrated by numerous diagrams and small maps.

With the publication of this part, the atlas is complete. It contains 64 good maps, and a large amount of printed information, written by well-known geographers, an explanation of the terms and abbreviations used, and a copious alphabetical index. The publishers may be complimented on the regularity with which they have issued the monthly parts, and on the complete and useful atlas they have placed before the public at the very reasonable price of 1*l.*

Longmans' New Five-Shilling Atlas, for use in Schools, being a Selection of Maps from Longmans' New Atlas. Edited by Geo. G. Chisholm, M.A., B.SC. London, Longmans, Green, & Co., 1890. Price 5*s.*

This atlas is designed principally for the use of schools, and contains 32 maps, among which are the political maps published in "Longmans' New Atlas" in 1889, and which were noticed at some length in the 'Proceedings' for May of that year.

The physical features of each country, and the political divisions, are shown on the same map, the differences of elevation are indicated by a system of orographic colouring, in which the areas below a thousand feet above sea-level are distinguished throughout the atlas by a shade of light green. The British Isles form an exception to this rule, here three different areas are bounded by

contour-lines of elevation. On all the maps the sea is tinted in, at least, two colours, to show the area less than, as well as that which exceeds, a depth of 100 fathoms. On the maps of the World, Europe, and the West Indies, a series of contours is given.

The scale on which the maps are drawn is in many cases uniform, but where this is not the case it is a simple fraction of that used in the other maps. All the continents, except Europe, are on the scale of 1 : 40,000,000, Europe and Australia are on 1 : 20,000,000, all the larger countries are on 1 : 4,000,000, while the smaller ones, for which separate maps are given, are drawn on double the scale of the larger ones. The value of this system is that it enables the student to form an accurate idea of the comparative areas of different countries, and at the same time facilitates the comparison of linear distances as taken from different maps, their scales being simple fractions, or multiples one of the other.

A novel feature introduced into this atlas by Mr. Chisholm is the manner in which he has attempted to indicate the utility of rivers for the purposes of navigation, by marking them with symbols, five of which have been used for this purpose: a steamer indicating the head of navigation for sea-going vessels; an anchor and an "S" the locality beyond which river steamers cannot go; an anchor for smaller vessels or boats; while a bar drawn across the river shows that the presence of a rapid impedes navigation; and the same mark with "F" by its side shows where a fall occurs, or where some obstacle effectually stops navigation. The maps are so small that the full benefit of this excellent system is not obtained, owing to the difficulty there is in distinguishing the necessarily small symbols.

The boundaries of countries and subdivisions are shown by a line of red, but those of detached portions of provinces, &c., which are too small to be separately named, are left uncoloured, and included in the surrounding area. Care has been taken not to overcrowd the maps with names, and those given are printed in fairly large type. In following out this plan, the names of many places of secondary importance have been left out, but this is much better than overcrowding, while to remedy this the names so omitted are given in the index with their latitude and longitude, so that their places on the map can be found; the identification of those places has in many cases been made still easier by their position being marked with a cross wherever practicable.

Taken as a whole this atlas is a decided success, is superior to any of its class yet published in this country, and is well suited for the use of schools.

——— School Atlas, Physical and Political. Consisting of 35 maps besides insets. Engraved and lithographed by F. S. Weller, F.R.G.S. London, Longmans, Green, & Co., 1890. Price 2*s.* 6*d.*

This atlas has been specially prepared to meet the demand for improved teaching of geography. The maps are clearly drawn, and contain all the names mentioned in Longmans' School Geography. They are coloured to show both physical features, and political divisions; a complete index with the latitude and longitude of each place on the maps is given, and for its price it is a very useful little atlas.

——— Junior School Atlas, Physical and Political. Consisting of 17 maps besides insets. Engraved and lithographed by F. S. Weller, F.R.G.S. London, Longmans, Green, & Co., 1890. Price 1*s.*

PHOTOGRAPHS.

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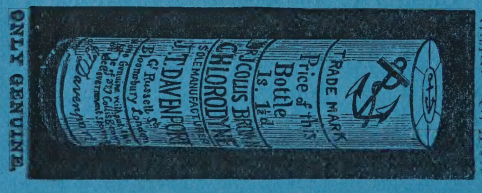

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